APPENDIX R

SPACE SHUTTLE PROGRAM CONTINGENCY ACTION PLAN

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R

SPACE SHUTTLE PROGRAM CONTINGENCY ACTION PLAN

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to serve as an integrated plan to predetermine the program response in the event of a Space Shuttle contingency. This plan will be implemented in concert with the OSF SFO Contingency Action Plan, and field center contingency plans. It has been written to augment each of these by providing the anticipated, integrated timelines of the formalized program response.

1.2 SCOPE

The Manager, Launch Integration, KSC has overall responsibility for contingency planning during flight preparation, launch ascent, and post-landing operations. During ascent, this responsibility continues until the Shuttle is established in a stable orbit or until landing, should a stable orbit not be achieved. The Manager, Launch Integration will hold a Mishap Response Teleconference (MRT) approximately one hour and 30 minutes after the contingency where specific actions will be levied by the MMT. Normal program elements will execute those actions along with this plan. The Manager, Space Shuttle Program will determine when the MMT no longer has operational oversight for this plan. The Manager, Launch Integration, KSC will retain responsibility for contingency operations until a formal investigation board is established, and/or until the Orbiter is returned to KSC.

1.3 DEFINITION

For the purpose of this plan, a program contingency is defined as any SSP-related failure, accident, or incident (involving SSP-controlled flight or test hardware, support equipment, or facilities) that significantly delays or jeopardizes the SSP or a flight, prevents accomplishment of a major objective, or terminates a flight prematurely.

NPD 8621.1G, NASA Policy Directive on NASA Mishap Reporting and Investigating Policy, defines six mishaps/contingencies in which the AA-OSF may become involved. They include Type A, B, and C Mishaps, mission failures, incidents, and close calls, all of which are defined in Table 1. The AA-OSF or delegated agent is the final authority in determining if an actual or suspected mission failure, accident, or incident constitutes a SSP contingency. All probable contingency situations will be reported to the AA-OSF or delegated agent for a final decision.

1.4 APPLICABILITY

This plan applies to any contingency situation during Space Shuttle operations where a multi-center response may be required. It applies to all SSP organizations and those agencies that support the SSP during a contingency operation. Use of this plan assumes the AA-OSF has declared, or will declare, an SSP contingency.

1.5 REFERENCED DOCUMENTS

This plan is intended to be consistent with the documents listed in Attachment 10 of this appendix.

1.6 NOTIFICATION

Those witnessing a potentially significant Shuttle Program incident will notify the appropriate element/project manager who in turn will notify the Manager, Space Shuttle Program. The Manager, Space Shuttle Program will be responsible for notifying the Deputy AA for International Space Station and Space Shuttle.

1.7 CONTINGENCY READINESS

Space Shuttle Program and Project personnel will participate in contingency response exercises that demonstrate the program's effective response. These will consist of exercises prescribed by NASA Headquarters' Office of Safety and Mission Assurance and as outlined in the OSF SFO Contingency Action Plan.

TABLE R.1

CONTINGENCY CRITERIA SUMMARY

Classes of Unexpected Events	Damage to Property, Facilities, or Equipment and/or Personnel Injury/Death		Investigation/Analysis
Type A Mishap	Greater than $1M	Death	AA-OSF appoints investigation board or Administrator chooses to appoint investigation board and board investigates mishap*
Type B Mishap	Equal to or greater than $250K but less than $1M	Permanent disability of 1 or more persons, or hospitalization of 3 or more persons.	AA-OSF or Deputy AA appoints investigation board and board investigates mishap*
Type C Mishap	Equal to or greater than $25K but less than $250K	Occupational injury or illness that results in a lost workday case.	Deputy AA appoints investigator or investigation team depending on significance of mishap*
Incident	Equal to or greater than $1K but less than $25K	Personal injury of less than Type C Mishap severity but more than first-aid severity.	Same as Type C mishap*
Mission Failure	A mishap of such severity that it prevents the achievement of primary NASA mission objectives as described in the Mission Operations Report or equivalent document.		An investigation board is required and Type A or B Mishap investigation procedures are followed*
Close Call**	No equipment/property damage equal to or greater than $1K	No injury or significant interruption of productive work	Investigated in accordance with its potential*

*If event involves more than one Center or has significant public interest, the AA-OSF, or delegated agent, may order an investigation board or recommend to the Administrator that the Space Shuttle Mishap Interagency Investigation Board be activated.

**Event which possesses high severity potential for any of the previous types of mishaps.

2.0 RESPONSIBILITIES

2.1 MANAGER, SPACE SHUTTLE PROGRAM

In accordance with the OSF SFO Contingency Action Plan, the Manager, Space Shuttle Program is responsible for ensuring that:

a. SSP contingency response actions are included in the OSF centers contingency plans.

b. The program is ready to manage appropriate actions to minimize losses, and preserve evidence, should a contingency occur.

c. The program is prepared to manage the contingency situation until a formal investigation board is established.

2.2 MANAGER, LAUNCH INTEGRATION, KSC

The Manager, Launch Integration, KSC is directly responsible for management of contingency activities after a suspected launch or EOM landing contingency has been reported. Immediately following a suspected contingency, the Manager, Launch Integration, KSC will implement this plan anticipating that the AA-OSF will declare the incident a program contingency.

The Manager, Launch Integration, KSC, will chair the MRT within one hour and 30 minutes after a contingency has been reported. The MMT will provide direct support to the Manager, Launch Integration, KSC.

The Manager, Launch Integration, KSC appoints the Chair of the Mishap Investigation Team (MIT), and activates the MIT, as necessary, with the approval of the AA-OSF.

2.3 MANAGER, SPACE SHUTTLE PROGRAM INTEGRATION

The Manager, Space Shuttle Program Integration is responsible for chairing the MMT during on-orbit activities. If a suspected mission contingency occurs, it is the responsibility of the Manager, Space Shuttle Program Integration, to coordinate and chair the MRT from JSC, and to inform the MMT.

Immediately following a suspected mission contingency, the Manager, Space Shuttle Program Integration, JSC will implement this plan anticipating that the AA-OSF will declare the incident a program contingency.

Responsibility for contingency operations will be transitioned back to the Manager, Launch Integration, KSC, after landing has occurred.

2.4 SPACE SHUTTLE PROGRAM ELEMENTS (MSFC PROJECTS/EVA/FCOD/PAYLOADS PROCESSING/SHUTTLE PROCESSING/SYSTEMS INTEGRATION/VEHICLE ENGINEERING)

In the event a failure, accident, or incident occurs involving SSP hardware or facilities, it is the responsibility of the respective element manager to take the following actions:

a. Assure that all possible action is taken to prevent injury to personnel, and damage or loss of equipment;

b. Notify, by the most expeditious means, the Manager, Space Shuttle Program; the respective Center Director; AA-OSF; and the Deputy AA-OSF;

c. Assure that the scene is secured against action that could impair investigation;

d. Protect records, logs, data books, film, etc.

e. Initiate preliminary on-site assessment to determine scope of potential contingency;

f. Initiate their respective center contingency action plans;

g. Support investigations of SSP contingencies under its own direction or under the direction of the lead center, a Headquarters Mishap Investigation Board (MIB), or any board established by the NASA Administrator or the President of the United States; and

h. Prevent sabotage and provide security.

2.5 MISSION OPERATIONS

When a potential contingency situation arises during mission operations, the Flight Director, as specified in JSC 12805, Flight Control Operations Handbook, will put contingency procedures into effect. All flight control and support personnel will be required to complete these procedures. Logs of each individual's equipment status prior to and at the time of the potential contingency will be completed. JSC Form 1441, Flight Director's Mission Log, will be used and completed as soon as possible after a mission contingency and prior to the release of the individual from the MCC or his/her support area. These logs will be collected by each area/specialty supervisor or lead flight controller, and forwarded to the Flight Director, who will provide the data to the MIB. A roster of all mission personnel will be provided in addition to the logs. At the time a contingency is suspected or declared, all personnel will immediately verify that their logs are up-to-date and will institute a "hands-off" policy with regard to switches, push-button indicators, knobs, recorders, etc., as is appropriate to continued flight safety. The MCC will remain active in support of the potential contingency until released by the AA-OSF

or the Manager, Space Shuttle Program. Upon release of the MCC, its functions in support of the contingency will be transferred to the Technical Action Center.

3.0 REQUIREMENTS

3.1 PERSONNEL NOTIFICATION

All Space Shuttle program elements shall provide predefined notification lists within their respective center contingency action plans to address any failure, accident, or incident involving program resources. These predefined notification lists will be executed within 60 minutes of the suspected incident. The notification shall include a description of the potential contingency; its cause, if known; associated information leading up to the potential contingency; any actions that have been initiated or are planned; and recommendations for a course of action.

The manning of action centers and communication networks also shall be predefined to ensure an organized and timely response. Attachment 2 describes the NASA Action Centers at NASA HQ, MSFC, KSC, JSC, and SSC.

3.1.1 Launch Notification Sequence

The Manager, Launch Integration, KSC will notify the members of the MMT who, in turn, will notify their respective organizations. The Flight Director shall notify the JSC MCC, and the LSO shall notify specific NASA and other government personnel.

3.1.2 Mission Notification Sequence

During SSP mission activities, officials will be notified through normal mission-monitoring activities. The SSP Manager will notify the Deputy AA for International Space Station and Space Shuttle or delegated agent of the potential contingency.

3.2 TEAM NOMINATIONS

The Manager, Launch Integration, KSC, or his designee shall be responsible for publishing a list of the qualified personnel two weeks prior to the FRR for each flight. This includes membership of the NASA MRT, MIT, RRT, and the Crew Recovery Team (CRT). MIT personnel will be on alert to depart for the contingency scene as soon as a contingency has been declared. A list of the positions to be filled for each team is included in Attachment 1.

The travel of all NASA personnel to an overseas landing site shall be approved by the AA-OSF, with responsibility delegated to the Manager, Launch Integration, KSC. All personnel deployments and manifests will be provided to the Office of External Rela-

tions at NASA HQs approximately two weeks prior to each mission to ensure timely visa requests.

3.2.1 Mishap Investigation Team

The MIT shall be responsible for immediately traveling to the contingency site to gather first-hand information, take witness statements, and preserve material, which could be valuable to the formal investigation board. The turnaround/ salvage teams shall not begin their operations until the Orbiter is released by the MIT. The MIT shall comply with NPD 8621.1G and the NASA Headquarters OSF SFO Contingency Action Plan. The MIT Chair is appointed by the Manager, Launch Integration, KSC and approved by the AA-OSF. Once deployed, all MIT members are considered on detail from their field centers and are responsible only to the Chair. If the Orbiter should land undamaged, a decision not to deploy the MIT may occur at the MRT. Reference Attachment 5 for the detailed MIT Operations Plan.

3.2.2 Rapid Response Team

KSC shall prepare a KSC Off-site Transportation Plan for TAL site deployment. The RRT will arrive at the contingency site within approximately 18 hours. These plans shall be modified realtime to reflect the actual condition of the Orbiter. The activation of the airlift shall begin when the LRD calls the DDMS Operations SOC to request airlift. The SOC shall then notify the Air Mobility Command (AMC) Tanker Airlift Control Center for actual aircraft deployment. KSC, in conjunction with the AMC Tanker Airlift Command Element (TALCE) (once in place), shall coordinate support for arriving aircraft at NASA and TAL facilities.

The RRT shall consist of personnel under the direction of the KSC GOM who will evaluate the condition of the Orbiter and determine any additional requirements to prepare the Orbiter for ferry. The RRT will modify existing contingency planning to accommodate the realities of the Orbiter configuration and landing site facilities. If Orbiter towing equipment is not available at the landing site, the RRT will transport towing equipment to the site, if possible. Most of the RRT shall be deployed from KSC. For a TAL, the aircraft will pick up personnel and equipment at the KSC SLF approximately six hours after the TAL declaration. Estimated deployment timelines are in Attachment 6 of this appendix.

a. Augmented Landing Site Rapid Response - Three landing sites in the European and African continents shall have personnel trained to participate in an Orbiter recovery. Personnel from the sites at which the Orbiter did not land will be utilized at the actual landing site. The aircraft used for transportation will be the SAR or MEDEVAC aircraft (C-130) stationed at the TAL sites. The KSC GOM shall identify the personnel, and the request for transportation will be coordinated with the DDMS and the DOD/SOC at PAFB.

b. Non-augmented Landing Site Rapid Response - Unscheduled Orbiter landings will likely occur at ALS where NASA and DOD personnel will be trained and equipped to take care of an Orbiter that has landed. However, the possibility remains that the landing of an Orbiter may occur at an airfield other than an ALS. If such a landing should occur, the capability may exist for equipment and personnel at the ALS to reach the Orbiter before any response aircraft from CONUS. The aircraft used will be the SAR or MEDEVAC aircraft stationed at Zaragoza Air Base (AB), Banjul, and/or Ben Guerir.

3.2.3 Crew Recovery Team

In the event of a non-CONUS landing, the JSC FCOD will send the KC-135 aircraft containing the CRT from JSC EFD to the location of the flight crew. The purpose of this aircraft is to return the flight crew to the U.S. Transportation of other JSC personnel on the KSC RRT will be provided to the KSC SLF. A DDMS provided aircraft will be used as a backup aircraft in the event that the NASA KC-135 is unavailable. The DOD, using available SAR/MEDEVAC aircraft, will provide evacuation for uninjured flight crew members to the nearest U.S. military base, if necessary. The estimated typical TAL timeline for the KC-135 deployment is in Attachment 6 of this appendix.

3.3 MISHAP RESPONSE TELECONFERENCE

A MRT will be established within one hour and 30 minutes after a suspected launch, on-orbit, or EOM landing contingency occurs.

a. Launch MRT - The KSC Launch Integration Staff Office will be responsible for coordination and set-up of the teleconference in Room 1R29 of the Launch Control Center. The teleconference will be effected by MCI communications. The Chair shall be the Manager, Launch Integration, KSC. The teleconference shall cover a review of pertinent facts, statements of contingency actions, and a review of deployment schedules of response teams. Access to the MRT will be predefined, and approved by the Manager, Launch Integration, KSC prior to the prelaunch MMT review.

b. Mission MRT - Upon notification of a suspected contingency, the Manager, Space Shuttle Program Integration will chair the MRT from JSC. The Space Shuttle Customer and Flight Integration Office, JSC will coordinate the teleconference.

A complete description of the MRT is included in this appendix in Attachment 3.

3.4 SEARCH AND RESCUE REQUIREMENTS

SAR capabilities will be provided through the DDMS on a per site basis. Given 24-hour advanced notice, Air MEDEVAC will be available at the primary CONUS EOM sites and the TAL sites. ELSs will have no prepositioned Shuttle support resources and the DOD SAR and MEDEVAC effort will be on a "best effort" basis.

3.4.1 Kennedy Space Center

KSC will have the following resources available for launch, RTLS, EOM, and near coastal bailout:

Required:

a. DOD HH-60 helicopters on standby at the SLF

b. One UH-1 NASA helicopter

c. One DOD HC-130 positioned 175 nm downrange (excluding EOM support)

d. One DOD HC-130 and KC-130 positioned at PAFB (excluding EOM support)

If available:

a. One E-2C positioned at PAFB (excluding EOM support)

b. One U.S. Navy ship with helicopter (excluding EOM support)

c. One Coast Guard cutter with helicopter

Each DOD helicopter will carry one medical doctor and two pararescuemen and have the capability to transport two astronauts in litters. Each HC-130 will have two 3-man pararescue teams with motorized inflatable rafts.

3.4.2 Edwards Air Force Base

When given 24-hour advanced notice, EAFB will have DOD UH-60 or UH-1 MEDEVAC helicopters available for EOM landings. Each UH-60 helicopter will carry one medical doctor, three Emergency Medical Technicians (EMTs), and up to three flight crew members. Each UH-1 helicopter will carry one medical doctor, one EMT, and two flight crew members.

3.4.3 White Sands Space Harbor

WSSH will have UH-1 MEDEVAC helicopters available for EOM landings, given 24-hour notice. Each helicopter will carry one medical doctor, one EMT, and two flight crew members.

3.4.4 TAL Sites

TAL sites will have available the following SAR/MEDEVAC resources to support a landing:

a. One DOD fixed-wing aircraft (C-130) at Banjul, The Gambia, for low inclination launches

b. One DOD fixed-wing aircraft (C-130) at Ben Guerir, Morocco

c. One DOD fixed-wing aircraft (C-130) at Zaragoza AB, Spain, for high inclination launches

The C-130 aircraft at Ben Guerir, Banjul, and Zaragoza will have two flight surgeons and nine pararescue specialists onboard. Each aircraft will be capable of transporting the entire flight crew. Fixed-wing assets along with equipment to support landing activities will be transported to Moron, Spain as needed.

3.5 EMERGENCY MEDICAL SERVICES

The Director, Space and Life Sciences Directorate, JSC has overall management responsibility for EMS operations. This will be implemented by the Medical Operations Branch through the FCR surgeon and through the respective site EMS coordinators. The on-scene physician is responsible for making realtime trauma treatment decisions until such times as the flight crew member is under the care of an Intermediate Medical Care Facility (IMCF) or Definitive Medical Care Facility (DMCF). Patient information will be relayed from the on-scene physician to the site EMS coordinator. EMS's are described more fully in Attachments 7 and 9 of this appendix.

3.6 COMMUNICATIONS

In the event of an unscheduled landing, all operational communications will remain in their landing support configuration until direction to do otherwise is obtained from the MMT or other appropriate site managers. Any other predefined communications in support of unscheduled landings will be activated after crew egress. It can be expected that the support role of some facilities will change to support this unscheduled event. For any unscheduled landings associated with the launch phase, the MMT will exercise its management role while still at the KSC LCC. Landings occurring after the MMT has arrived at JSC will be supported using the Action Center in the MCC. Landings at any non-CONUS bases with U.S. military presence will have telephone capability in place and active to either the tower or airport manager's facility. This phone line capability is provided by the DOD SOC. For landings at non-CONUS sites without U.S. military presence, the LSO in the MCC will utilize a hotline to the State Department. The State Department will contact the embassy in the country where the landing occurred. The

embassy will contact to the airport tower or airport manager's office. Within three days of a landing at a TAL site or non-CONUS ELS, DDMS will provide a 24-channel voice communications capability to handle non-secure communications with the DOD SOC and KSC.

3.6.1 MCC Communications

Handover of the Orbiter from the JSC FCT to the KSC turnaround team occurs at flight crew egress. At this time, the FCT and communication lines are nominally released. If a contingency landing should occur, continuing communications between the flight crew and the MCC Capsule Communicator (CAPCOM) and Flight Director will be required. This may occur via telephone or by leaving the flight communication channels active. It is to be expected that all communication channels will remain active until the MMT convenes. For an unscheduled landing, the voice control element and the LSO would remain on console in the MCC to provide support to those elements, which are involved in evaluating the situation.

3.6.2 TAL Sites

The primary TAL sites will have three International Maritime Satellite (INMARSAT) terminals available for use prior to launch. These circuits will provide primary communications to the MCC and LCC. The channels are:

a. Landing Field Prime 1

b. Weather Observer, which is time-shared between voice and data transmissions

The following circuit reallocations will occur after the landing:

c. The Landing Field Prime 1 circuit will be left to its normal functions and additional JSC/DDMS coordination, as necessary.

d. The Weather Observer circuit will be reconfigured to the Convoy Commander net, to be used for local UHF communications with units around the TAL site.

e. The Weather Aircraft circuit will be used for initial MCC communications including medical status, flight crew debrief, flight crew family conversations, and recording the flight crew's statement. Should a bailout occur, this circuit would be used by DDMS to communicate with the SAR aircraft.

In addition, each flight crew member will have a PRC-112 UHF handheld radio in his flight suit, capable of transmitting and receiving on 282.8 MHz and 243.0 MHz. Attachment 8 describes the communications available at each TAL site.

3.6.3 Daily Status Teleconference

A daily status teleconference will be established from the landing site to KSC to report the progress of turnaround operations. The time will be established after the MRT.

Participants will vary according to the condition of the Orbiter and the recovery and turn-around progress.

3.7 AVAILABLE LANDING SITES

There are a variety of landing sites loaded into the Orbiter software available for flight crew selection during flight by item execution on the horizontal situation display. High and low inclination launches have different sites defined in the software. In addition, landing sites are defined as either (1) augmented, with Shuttle-specific landing aids and NASA personnel available or, (2) emergency, with 8,500 feet of available runway and a TACAN. The sites available are listed in NSTS 07700, Volume X - Book 3. Personnel at DOD ALS's and overseas ELS's have received rescue training. Attachment 6 of this appendix lists the types of landings that could occur and a nominal contingency response timeline for each site. Annex 1 to Appendix R will be published as a separate document for each mission to specify the configuration and operations for each landing site. This document will assist KSC and DDMS in planning and staffing for required support.

3.7.1 Return to Launch Site

The RTLS scenario will return the Orbiter to the SLF within 25 minutes. The RTLS may be declared between approximately T+2:30 and T+4:05 minutes. A convoy will be located at the SLF with purge, towing, fire, and rescue capabilities. Attachment 6, Table R6.1, of this appendix details an estimated RTLS timeline.

3.7.2 Transoceanic Abort Landing

A TAL may result in the Orbiter landing at the prime TAL sites of Ben Guerir, Morocco; Moron AB, Spain; Zaragoza AB, Spain; or Banjul, The Gambia. The TAL may be declared between approximately T+2:30 minutes and MECO. The primary TAL site will be manned by approximately 40 predeployed people to provide landing aids and weather operations. Fire and rescue capabilities will be present. The DOD MEDEVAC aircraft will evacuate the flight crew to Naval Station Rota, Spain if uninjured, or to appropriate medical facilities if injured. The flight crew will remain together unless medical circumstances dictate otherwise. The USA Transportation Office has developed airlift schedules for RRT personnel and equipment. All TAL sites are downgraded after launch day, with most of the personnel support released. If a TAL occurs, the NASA GOM will have a prepared press statement for release to the local media thanking the local government and explaining the nature of the landing.

Attachment 6, Table R6.3, of this appendix details a typical TAL timeline.

3.7.2.1 Support Requirements Available at Each TAL Site

Different TAL sites are governed by different international agreements and may have site-unique support personnel and facilities available. A synopsis of the support

provided is included in Attachment 8 of this appendix on those sites that have a high probability of a TAL occurring.

3.7.3 Abort Once Around

The AOA will result in a landing at either EAFB, California; WSSH, New Mexico; or KSC, Florida. It may be declared from MECO to approximately T+30 minutes. There will be personnel at each location to support convoy operations. This convoy does not allow the vehicle to remain powered up, but has adequate equipment for purge (excluding WSSH) as well as fire and rescue operations if needed. KSC ground operations personnel will be immediately dispatched for ground turnaround activities. The vehicle will remain on the runway until KSC personnel arrive if it is damaged; otherwise, the Orbiter will be secured and towed to the deservice area. Warm air purge (excluding WSSH) and around the clock surveillance will be provided until the turnaround team arrives. Attachment 6, Table R6.4, of this appendix describes a typical AOA timeline.

3.7.4 Emergency Landing Sites

3.7.4.1 Primary Landing Site (PLS)

Daily PLS's are identified for each mission. These are the sites that provide the best opportunity for an emergency deorbit to a NASA-supported facility (EAFB, WSSH, KSC). It is also possible to have a Rev 3 Deorbit if the Orbiter is not cleared to continue to orbit. These landings will have minimal convoy support including purge, (excluding WSSH), fire, and rescue. The Orbiter will not remain powered up. The flight crew will return to JSC on the STA as soon as possible.

3.7.4.2 Non-NASA Supported Facility

For an emergency landing at a CONUS site, KSC personnel will be airlifted and equipment will be loaded and shipped by rail or truck from EAFB and KSC. It is estimated to take at least 72 hours to begin equipment deployment. The flight crew will be picked up by the JSC STA, as soon as possible, and returned to JSC. The response timeline will be similar for the AOA up through the teleconference and press conference.

3.7.4.3 Emergency Landing at Non-CONUS Site

For an emergency landing situation where the Orbiter lacks sufficient time or energy to reach a PLS, the software loads onboard the Orbiter provide guidance to a variety of landing sites. These sites will not have personnel predeployed, and if they are non-DOD airfields, they may not have received any Shuttle-unique rescue training. Some non-U.S. sites may not have been notified by NASA that they are in the software loads.

The profiles of the facilities available at each local U.S. Embassy are available through the U.S. State Department. The Embassies have been sent an Airgram giving pertinent details of an Orbiter landing, and actual notification of an impending Orbiter landing will be accomplished by the State Department via a flash message and telephone call. In these instances, the flight crew will retain responsibility for the Orbiter until either (1) they are evacuated out or, (2) a U.S. citizen with a secret clearance arrives at the landing site. The flight crew will carry onboard letters of explanation to the local officials giving simple precautionary instructions and telephone contacts. In the timeline, a C-130 is shown arriving at the site at L+5H. This assumes a landing has occurred at a site that could be reached by the SAR or MEDEVAC C-130 from an ALS within two hours. This time could vary significantly depending on how close to the ELS a U.S. presence is and on the suitability of the airfield. The RRT will arrive in a minimum of 25 hours, assuming the Landing Operation Team is already deployed to DFRF. Aircraft support from the AMC will be best effort. A typical timeline is described in Attachment 6, Table R6.5, of this appendix.

3.8 BAILOUT

Preparations for flight crew bailout will be initiated by starting cabin depressurization to equalize cabin pressure with the altitude. A nominal bailout will begin at 20,000 feet taking approximately two minutes to egress all flight crew members. A bailout may be declared at any time when it is known that there is insufficient energy to reach a runway. The Commander may declare a bailout without MCC knowledge if there is a loss of communications. DOD SAR forces are prepositioned at KSC and TAL sites to locate and/or retrieve the flight crew as soon as possible. Initial DOD SAR forces are under the control of the DOD SOC at PAFB, FL. The progress of the SAR effort shall be reported to the DOD LSO. The LSO will report efforts to the Flight Director and appropriate officials. A typical timeline is described in Attachment 6, Table R6.6, of this appendix.

3.9 CREW CHECKLISTS

The flight crew will carry onboard the Orbiter a series of checklists to aid in post-landing operations after a contingency landing at a non-EOM site. These will be located in the Flight Data File Maps and Charts book. The Initial Flight Crew Response is included in this appendix as Attachment 7.

3.10 ORBITER TURNAROUND

After the RRT begins initial safing and towing of the Orbiter, approximately 400 more personnel will be deployed for turnaround operations. These operations will be controlled by the TAL Orbiter Recovery Plan, which describes the responsibilities for the

management and conduct of the preparation and return of an Orbiter from a TAL site. The detailed plan for TAL Orbiter Recovery is included in this document as Appendix S.

3.11 SALVAGE OPERATIONS

In the event that the Orbiter/payload cannot be returned to KSC via normal ground turnaround and ferry procedures, SFOC-GO-0014, KSC NSTS Salvage Plan, will be implemented. This plan establishes the structure of the Shuttle salvage organization, the assignment of responsibilities, and management procedures to be used in conducting Orbiter/payload salvage operations.

Salvage operations requirements under the direction of KSC Shuttle Processing are as follows:

a. Develop, prepare, and implement the Space Transportation System (STS) Transportation and Salvage Plans.

b. Provide the organization and staffing of KSC/contractor personnel for recovery and salvage operations.

c. Coordinate with applicable government and commercial agencies for services, equipment, and personnel required to effect recovery and salvage operations.

d. Identify support hardware and equipment required for recovery and salvage operations.

e. Coordinate with and advise the Department of Defense (DOD) regarding the transportation of personnel and equipment and/or salvaged items of the Orbiter and its payload.

Salvage Operations will be conducted in support of and under the direction of the designated mishap investigation team or accident investigation board until the scene/hardware has been released from further investigation.

3.12 ACTING WORKING GROUPS

Activation - The MIB Chair will activate working groups appropriate to the contingency situation. The Manager, Space Shuttle Program, may also activate the working groups either prior to the appointment of a MIB Chair, or at the request of the AA-OSF or delegated agent or at the request of another Center Director. The appropriate center will provide personnel to support any working group established to evaluate the contingency including those specified in this plan.

As a basis for the selection of working groups for a specific contingency investigation, a description of various working groups is provided in the following paragraphs. Any or all

of the working groups may be activated. There is no limit to the number of specialized working groups that may be appointed.

The MIB Chair may rearrange the working group structures and define their roles as required. Maximum use should be made of government and contractor experts as consultants or advisors to the working groups and the MIB.

Responsibilities - Each activated working group is responsible to the MIB for performing the following functions within the scope of the group's assigned investigation activities:

a. Take all possible action to prevent injury to personnel and damage or loss of equipment, property or data.

b. Obtain and review contractor and NASA records pertaining to receipt, inspection, configuration control, assembly, reliability, quality control and checkout, as well as any other records pertinent to the investigation.

c. Obtain and review contractor and NASA procedures associated with the activity taking place at the time the contingency occurred.

d. Reconstruct the circumstances under which the contingency could have been initiated.

e. Perform interviews and obtain witness statements as soon as practical after the occurrence of the contingency.

f. Review all data, which may have a bearing on the contingency.

g. Report progress to the MIB on a periodic basis (daily, weekly, etc.) as required by the Board Chair.

h. Participate in MIB meetings when working groups of overlapping interest are reporting.

i. Perform other services as directed by the Chair of the Board of Investigation.

3.12.1 Impoundment/Classified Data Working Group

The Impoundment/Classified Data Working Group will review all data, information and findings to determine if security classification guidance is applicable, and where applicable, will ensure proper classification handling is implemented. This group will also have the overall responsibility for ensuring proper data impoundment procedures are followed and impoundment records are maintained.

3.12.2 Systems Integration Working Group

The Systems Integration Working Group is responsible for the analysis of the integrated Space Shuttle Launch Vehicle data which includes the environment, aerodynamics, flight dynamics, and total vehicle loads.

3.12.3 Vehicle Engineering Working Group

The Vehicle Engineering Working Group is responsible for all of the Orbiter systems-associated instrumentation, prelaunch and post-launch data applying to those systems, and associated support not covered by the Facilities and Ground Support Working Group.

3.12.4 Propulsion and Power Working Group

The Propulsion and Power Working Group examines Orbiter propulsion and power subsystems such as reaction control subsystem, auxiliary power unit, orbital maneuvering subsystem, and hydraulics, pyrotechnics, fuel cells and power reactant storage and distribution subsystems. This group will also assess the integrated main propulsion system for conditions that may have contributed to the contingency.

3.12.5 Navigation, Control, and Aeronautics Working Group

The Navigation, Control, and Aeronautics Working Group will analyze and document the performance of the integrated avionics system, define requirements and compare these data to preflight predictions and post-flight history, and reconstruct flight dynamics, as required.

3.12.6 Avionics and Software Working Group

The Avionics and Software Working Group will analyze and document the performance of the integrated avionics system (includes all essential onboard electronics and software). Coordinate the retrieval and interpretation of data from recovered avionics units. The group will interface with the Navigation, Control, and Aeronautics Working Group as appropriate.

3.12.7 Structures and Mechanics Working Group

The Structures and Mechanics Working Group will analyze the Orbiter structural integrity, loads, structural dynamics, materials, thermal protection system, thermal control system and the purge, vent, and drain system. Orbiter mechanical systems, including interfaces between the Orbiter and External Tank, and their performance will also be reviewed.

3.12.8 Crew and Thermal Systems Working Group

The Crew and Thermal Systems Working Group will examine Shuttle environmental control and life support systems and EVA equipment.

3.12.9 Mission Operations Working Group

The Mission Operations Working Group is responsible for the MCC, network control center, network stations, and the associated data which may have a bearing on

the contingency. Responsibilities may include a review of the flight plan, MCC, NCC, and network configurations and procedures, flight control, communications with the launch site and flight vehicle, and commands (including spurious signals) to the SSV or attached payload. This working group is also responsible for reviewing the adequacy of all operating procedures and actions. Adequacy pertains to the adherence to and compliance with the procedures, the effectiveness of the procedures, and the flight controller training and certification processes.

3.12.10 Flight Crew Operations Working Group

The Flight Crew Operations Working Group is responsible for analyzing any flight crew procedures, training, or other factors involving crew participation which may have a bearing on the contingency.

3.12.11 Payloads/Cargo Working Group

The Payloads/Cargo Working Group is responsible for all payloads, including payload support equipment and consumables. This responsibility also includes examining pre-launch and post-launch data, payload integration, engineering, hardware safety, checkout and payload status at the time of the contingency.

3.12.12 Photographic and TV Analysis Working Group

The Photographic and TV Analysis Working Group is responsible for analyzing all available photographic and video data which may have a bearing on the contingency. This working group will also be responsible for processing, screening, and analyzing optical products. The working group will define and manage all imagery enhancement required and will perform the intercenter coordination required for all photographic investigation products.

3.12.13 Records and Witnesses Working Group

The Records and Witnesses Working Group is responsible for obtaining and reviewing contractor and NASA records pertinent to the contingency, including records on receipt, inspection, configuration control, assembly, reliability, quality control, checkout, and modification. Records may be impounded, if required. This group will accumulate and review statements of witnesses as soon as possible after the contingency.

3.12.14 Timeline Working Group

The Timeline Working Group will analyze all data (telemetry, photographic, etc.) concerning the contingency and will correlate the chronological timeline which will be used by other working groups in their analyses.

3.12.15 Public Affairs Working Group

The Public Affairs Working Group is responsible for the coordination and release of information in accordance with the NASA management instructions and the operational procedures outlined in the Center support plans. The PAO representative will develop and coordinate all public releases with the MIB Chair and will also effect coordination through normal PAO channels.

3.12.16 Fire, Explosives, and Radiological Working Group

The Fire, Explosives, and Radiological Working Group is responsible for locating, identifying, and plotting the position of any fire, explosive, or radiological hazard patterns and the associated debris. This working group is also responsible for reconstructing the circumstances under which such hazards could have been initiated.

3.12.17 Medical and Toxicological Working Group

The Medical and Toxicological Working Group will analyze all medical factors which may have a bearing on the contingency and assess any actual or potential health hazards or stress associated with the mission. In the formation of this working group, reference should be made to the Medical Contingency Action Working Group, defined in Paragraph 3.12.18, established immediately following the contingency.

3.12.18 Medical Contingency Action Working Group

The Medical Contingency Action Working Group responsibilities are to identify the relevant circumstances under which an injury or death occurred, considering those factors which may have led to the injury or death; review all relevant medical documents including autopsy reports; and formulate recommendations concerning corrective action as appropriate.

3.13 OTHER WORKING GROUPS

In addition to the working groups listed above, the lead center for the investigation will support the following working groups.

3.13.1 Facilities and Ground Support Working Group

The Facilities and Ground Support Working Group will evaluate launch and landing facilities, test support systems, and ground support equipment that includes servicing and deservicing equipment at the primary, backup, secondary and contingency landing sites and at ground test sites.

3.13.2 Launch, Landing, and Retrieval Operations Working Group

The Launch, Landing, and Retrieval Operations Working Group is responsible for reviewing all flight, ferry, launch, landing, and ground service operations associated with

the contingency. This includes landing operations and deservicing at secondary and contingency landing sites, and at ground test sites.

3.13.3 Search, Recovery, and Reconstruction Working Group

The Search, Recovery, and Reconstruction Working Group is responsible for performing the search for and recovery of critical vehicle flight components for determination of the exact cause of the contingency. Upon recovery of the hardware, the working group will take precautions to maximize the use of the recovered components for failure analysis. These steps will include photographic documentation, preservation and sampling.

3.14 CONSULTANTS

The following consultants should be assigned by the MIB Chair and approved by the Center Director:

a. Counsel from the legal office will be available whenever witnesses are being questioned or when legal problems arise, or when legal advice is needed by the MIB.

b. The PAO will provide advice and assistance regarding news releases or public information.

c. A safety official; and

d. Others as required.

3.15 SPECIALISTS

As many specialists as necessary will be appointed by the Chair of the MIB. Specialists will participate in the MIB meetings and be available, at the request of the Chair, to assist the working groups. These specialists can be selected from outside NASA; however, non-government employees or non-full-time government employees will not be voting members of the MIB.

4.0 INVESTIGATION GUIDELINES

4.1 GENERAL

The investigation is conducted to determine the cause of the contingency and to recommend steps to prevent recurrence of such a contingency. If the MIT is activated following the MRT, all evidence and data collected will be turned over to the formal MIB, once established. The MIB and each working group involved in the investigation will

document their findings, determinations, conclusions, recommendations, and the procedural methods used during the investigation. Various guidelines for conducting an investigation are provided in the following paragraphs.

4.2 SUPPORT FACILITIES

The centers will support any investigation that may be required. Necessary resources to conduct the investigation - administrative, facilities, secretarial support, communications, data access and security systems - will be made available to the MIB. To the extent possible, the respective center will utilize existing facilities, organizations, and procedures for data handling and analysis.

4.3 SECURITY

Security, as it pertains to this plan, applies not only to classification of data, but also to restricting access to accident-sensitive areas to approved personnel only. NASA security regulations do not apply to the DOD supporting facilities, except for those specified instances where joint DOD/NASA agreements are available. Security coordination with contractor security services will be provided.

4.4 ACCIDENT SITE PRESERVATION

Those resources committed to support the SSP at the time of the contingency will be preserved in their operational state and configuration until released by the AA-OSF or MIT Chair. Space vehicle and launch or impact-site debris will be moved only as authorized by the AA-OSF or MIT Chair, except when mandatory for rescue personnel, firefighting, or removal of explosives. The DOD forces and equipment that are available for location and removal of salvageable components are responsible to the DOD for command and control. The AA-OSF or MIT Chair is responsible for requesting the DOD to utilize salvage equipment or move debris in the vicinity of KSC or adjacent shallow water areas, if required. The term vicinity applies to the Florida mainland and shallow waters of the Atlantic Ocean for which 45th Space Wing (45SW) agreements exist. The DOD Manager for Space Shuttle Support may be required to provide salvage/retrieval on a world-wide basis. Arrangements will be made to store damaged hardware, equipment, debris, etc., in controlled facilities, if necessary. Duties listed for the AA-OSF or MIT Chair in this paragraph will be assumed by the MIB Chair when investigation responsibility has been turned over to that board. Exceptions to this policy will be justified when equipment or actions are necessary to ensure personnel safety.

4.5 NETWORK INSTRUMENTATION

The Flight Director will make timely recommendations to the Manager, Space Shuttle Program, regarding equipment and network instrumentation to be released from further

flight or test support. The Manager, Space Shuttle Program, should reach early agreement with the DOD Manager on the appropriate status of configuration control for any pertinent DOD equipment. GSFC will be kept informed through the Network Director of all decisions involving the network and recorded data requirements.

4.6 DATA HANDLING

4.6.1 General

Data designated in the implementing message, such as realtime recordings of telemetry, plotboard charts, trajectory data, tape recordings, weather reports, digital command system and tone command tapes, acquisition aid data, signal-strength records, photographs, etc., will be reduced into legible format as soon as possible and distributed as required to support the investigation. The MIB Chair may specify any special data requirements for use by the investigating authority. All other mission data may be processed in a normal manner on a noninterference basis with data in support of the investigation.

4.6.2 Records

The Director of Mission Operations, the Manager, Space Shuttle Program, the Manager, Launch Integration, and the Manager, Space Shuttle Vehicle Engineering, may impound applicable/appropriate records and protect NASA records pertinent to the contingency. These may include records of receipt, inspections, modifications, reliability and quality control, assembly and checkout, configuration control, and resolutions of significant technical problems. A custodian within each working group will be designated for these records and will retain the records for use by the MIB.

4.6.3 Security of Data

Data associated with the contingency will not be reclassified. To ensure all data are available to the MIB, the distribution of these data will be restricted and accorded special handling procedures as specified in this plan. Except for direct support of continued flight operations, and to the extent permitted by law, no information or data will be released to any person without a need-to-know, as designated by the Manager, Space Shuttle Program until such time as the MIB Chair is appointed. To the extent provided by law, access to the processed and reduced data associated with the investigation will be limited to personnel involved with the failure investigation until the data are released by the MIB Chair.

4.6.4 Public Release

Any public release of information relating to a contingency is the responsibility of the PAO. The Manager, Space Shuttle Program, in consultation with the AA-OSF or

designated agent, will provide guidance to the Manager, Launch Integration and the Director of Public Affairs, Flight Director, DOD Representative, and other appropriate personnel until a duly appointed MIB assumes investigative responsibilities.

4.7 REPORTS

The Mishap Investigation Board Report shall consist of five volumes which are entitled:

a. Volume I: The Report

b. Volume II: Appendices

c. Volume III: Proposed Corrective Action Implementation Plan

d. Volume IV: Lessons Learned Summary

e. Volume V: Witness Statements/Recordings/Transcripts

The convening authority may also require the MIB to prepare intermediate reports. The MIB reports will be submitted to the convening authority and to other organizations as appropriate.

The working groups will report their progress periodically or at prearranged intervals as established by the MIB. Preliminary investigative reports will be reviewed at a time designated by the MIB Chair.

Time-lost reports will be filed for cases in which hospitalization for more than five days or death occurs.

The MIB will assemble lessons learned in the form of a summary of corrective actions.

4.7.1 Minority Reports

If a MIB member disagrees with the findings, conclusions, or recommendations of a majority of the MIB, a non-concurrence statement will be appended to the report and become a part of the report.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 1

RESPONSE PERSONNEL

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 1

RESPONSE PERSONNEL

1.0 PURPOSE

This attachment lists the contingency response teams and the persons who maintain the personnel list and manifest for each team. The organization responsible for each list will submit nominations or changes to the existing lists 10 days prior to launch. The 10 days is necessary for visa processing by the NASA HQ. The nominations or changes will be submitted to the Space Shuttle Customer and Flight Integration Office at JSC.

1.1 RAPID RESPONSE TEAM

The KSC Shuttle Processing Directorate is responsible for the RRT. The Shuttle Processing Integration Office, PH-M1 at (321) 861-9324, maintains the manifest for the team. The following is representative of the types of positions that may be filled:

a. Fire and Rescue

b. Weather

c. Quality Control

d. Safety

e. DDMS Representative

f. Medical

g. Shuttle and Payload Engineering

h. Shuttle and Payload Operations

i. External Relations (PAO)

j. Crew Support

k. Life Support

l. Security

1.2 MISHAP INVESTIGATION TEAM

The MIT is the responsibility of the Manager, Launch Integration, KSC. The Flight Crew Operations Directorate at (281) 483-3916, maintains the manifest for the team.

The following positions will be filled:

a. Chair

b. Flight Trained Crew Representative

c. Flight Surgeon

d. Orbiter Engineer/Mishap Investigator

e. Main Propulsion System Engineer

f. Photographer

g. DDMS Deployed Forces Commander

h. Payload Representative

i. Safety Representative

j. Technical Writer

k. Ground Operations Manager

l. Administrative Manager

1.3 CREW RECOVERY TEAM

The FCOD is responsible for the CRT. The manifest for the team is maintained by the AOD at 281-244-7226. The following positions will be filled:

a. JSC FCOD Director and/or his representative(s)

b. JSC Flight Surgeon

c. JSC PAO Representative

d. KSC Security Representative

e. Six KC-135 Aircrew Members

f. Two AOD Mechanics

APPENDIX R, ATTACHMENT 2

CONTINGENCY ACTION CENTERS

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 2

CONTINGENCY ACTION CENTERS

1.0 PURPOSE

The NASA Action Centers to be used in a contingency situation are described in this attachment. Telephone numbers for these action centers are not normally released, but are available in the MCC, LCC, and each action center.

1.1 NASA HEADQUARTERS

The NASA HQ MAC is located in NASA HQ Building, Room 7D61. The room that is normally the Management Information Center will be activated, as required, following a contingency situation.

1.2 JOHNSON SPACE CENTER

The Technical Action Center is located in the MER, Building 30S, Rooms 1344, 1345, 1352, and 1358. It will provide a focus for coordinating the activities of JSC working groups supporting a contingency investigation. It will provide a means of relaying messages, actions, and other communications between JSC organizations and external persons or agencies involved in the investigation.

1.3 KENNEDY SPACE CENTER

The KSC Space Shuttle Contingency Action Center is located in KSC HQ Building, Room 3201. The KSC Space Shuttle Contingency Action Center provides voice teleconference, facsimile, and data communication capabilities. It is located near additional communication facilities, conference rooms, and reproduction facilities that can be made available for activities which require priority support. Current detailed information concerning action center capabilities is available from the Manager, Launch Integration, KSC, MK. The KSC Space Shuttle Contingency Action Center will serve as the official KSC center for all activities related to the contingency. It will be placed under the direction of the investigation board when requested by the board Chair. More information on KSC actions plans is available in KDP-KSC-P-1450, NSTS Contingency Action Plan for KSC.

1.4 MARSHALL SPACE FLIGHT CENTER

The MSFC Shuttle Action Center (SAC) is located in the Shuttle secured area of the HOSC, Building 4663. The SAC is staffed 30 minutes prior to ET tanking during launch

operations through Launch + 30 minutes. A full range of communications is available in the SAC and these can be used, as needed, during contingency situations. In addition, the MSFC Center Director or Manager, Space Shuttle Projects Office may designate another conference room, on short notice contingency situations, if required.

1.5 STENNIS SPACE CENTER

The SSC contingency action center is located in the Primary Action Center located in Building 1100, Conference Room 101, at (228) 688-7999.

APPENDIX R, ATTACHMENT 3

MISHAP RESPONSE TELECONFERENCE

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 3

MISHAP RESPONSE TELECONFERENCE

1.1 MISHAP RESPONSE TELECONFERENCE

The MRT will be managed from the location of the Manager, Launch Integration, KSC, or the Manager, Space Shuttle Program, JSC. The participants will include, but are not limited to:

a. Manager, Launch Integration, KSC (Chair)

b. Mission Management Team

c. Landing Recovery Director

d. KSC Ground Operations Manager at DFRC

e. NASA Manager at landing site

f. Flight Crew

g. Payload Representative

h. Flight Director

i. Public Affairs

j. DDMS Representative

k. MIT Chair

l. Other managers as necessary

The MRT access list will be prepared by the Launch Integration Staff Office, KSC, for each mission and verified by the Manager, Launch Integration, KSC.

Local coordination of the MRT will be handled by the Launch Integration Staff Office, KSC; the Space Shuttle Customer and Flight Integration Office, JSC; and the Deputy AA for Space Shuttle, NASA HQs. At DFRC, the teleconference will be handled by the Shuttle Area Manager, and at WSSH, the Operations Director.

The MRT will be held via teleconference to the following locations:

NASA HQ: OSF MAC

JSC: MOD Action Center, Building 30, Room 225A

KSC: Launch Control Center, Conference Room 1R29
or HQ Building, Room 3201 (mission phase)

MSFC: Shuttle Action Center in the HOSC

TAL: (321) 867-4141

Optional:

DFRC: Executive Conference Room (below the Gold Room)

WSSH: WSSH Operations Control Room

The purpose of the teleconference is to enumerate the facts regarding the contingency, present the situation as it currently stands, and indicate the direction of investigation activities. The teleconference attendees should report to the teleconference locations at the appropriate times in order to debrief the situation in their area of responsibility and identify necessary requirements as soon as possible. The MRT Chair will prepare an agenda prior to the teleconference to expedite all discussions.

APPENDIX R, ATTACHMENT 4

MISHAP INVESTIGATION TEAM

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 4

MISHAP INVESTIGATION TEAM

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this attachment is to define the functions of the MIT and the process for activating the team. The MIT is designed to respond rapidly to a contingency situation. It is not meant to replace a formally-appointed MIB, but to assist such a board by gathering and preserving perishable or nonperishable data or evidence which would be used by a formal board.

This process will be implemented in concert with other Space Shuttle and field center contingency plans. In particular, it refers to the timelines for contingency response developed in Attachment 6, Estimated Contingency Landing Response Timelines.

1.2 SCOPE

The MIT is on call and may be activated any time from crew entry into the Orbiter until the Orbiter is delivered to the KSC MDD. The decision to activate the MIT is the responsibility of the Manager, Launch Integration, KSC.

1.3 APPLICABILITY

This plan applies to any mishap with the Orbiter resulting from a launch or landing mishap, or damage to the Orbiter on the ground after landing.

2.0 RESPONSIBILITIES

2.1 MANAGER, LAUNCH INTEGRATION

The Manager, Launch Integration, KSC is responsible for management of contingency activities after a launch or landing mishap. He will work through the KSC LRD and GOM at augmented landing sites. The MMT provides direct support to the Manager, Launch Integration, KSC. The Manager, Launch Integration, KSC shall appoint members of the MIT, and will deploy the MIT, as necessary, with the approval of the AA-OSF.

2.2 MIT MEMBERS

Persons appointed to the MIT will be identified in a mission-unique memorandum and will have the following individual responsibilities.

2.2.1 Passports/Medical

Maintain official passports and medical checks for worldwide travel.

2.2.2 Travel

Be prepared for travel within two hours after notification of MIT activation. Alternate MIT members are not required to be available within this time unless the primary member has requested him to take over his duties.

2.2.3 Prime/Alternate Members

Notify the MIT Chair of any changes between prime and alternate members from an organization.

2.2.4 Locator

Notify the appropriate "locator" of their whereabouts during the time the MIT is on call as described in Paragraph 4.4. This responsibility must be accomplished for the MIT to be an effective unit.

3.0 FUNCTIONS

3.1 PURPOSE

The primary purpose of the MIT is to gather and preserve evidence which will help a MIB determine why a mishap occurred. A written report of findings will be submitted to the Manager, Launch Integration, KSC and the MIB. The MIT will support the board, as requested. Once the MIT is activated, team members are considered on detail from their field centers and are responsible only to the Chair.

3.2 TEAM ORGANIZATION AND INDIVIDUAL FUNCTIONS

a. Chair:

1. On-site director of investigation.
2. PAO release.
3. Crew procedures/perform as group leader
4. Coordinate investigation team activities.
5. Provide investigative advice.
6. Identify requirements/obtain support.

b. Administration Manager:

1. Administration, documentation control/recorder, reports.

2. Provide administrative equipment and documents.

3. Photographer is a member of this group.

c. Operations/Human Factors Group (Group Leader - Flight Surgeon):

1. Safety/health of team members.

2. Witness statements to include crew, crash-worthiness, escape or egress, weather, airfield facilities, barrier, psychological and physiological factors, etc.

3. Equipment: Medical investigation kit, lap top computers (two), tape recorder/tapes, first aid kit.

d. Material Factors Group (Group Leader - Orbiter Engineer, Main Propulsion Member, Payloads Member):

1. Ensure safety of Orbiter systems, photographs, documentation/ description of damage, crash distribution diagram, description of systems, fire patterns, structures, power plants, wreckage reconstruction.

2. Equipment: Crash kit (available from JSC aviation safety office), tools, tape measure, magnifying glass, compass, tags for parts, camera equipment to include video and Polaroid, flashlight, level, etc.

3.3 ORGANIZATIONS SUPPORTING THE MIT

a. DDMS:

1. Provide support as required, Explosive Ordnance Disposal (EOD), SAR, salvage support, Armed Forces Institute of Pathology (AFIP).

b. Ground Operations Manager/LRD:

1. *Appropriate action to prevent injury to the crew and avoid further damage to the Orbiter. Take necessary action to safe the Orbiter.

2. *EOD, if applicable.

3. *Secure the site and control access. (Leave wreckage as found; move only in the interest of safety or first aid).

4. *Document the original state of the evidence if altered by initial actions.

5. *Preserve evidence that may be subject to deterioration.
6. *Provide support to MIT, as required.
7. Locate witnesses and obtain initial statements, names, and addresses.
8. Photograph evidence to include the Orbiter, ground scars, skid marks, broken trees, etc.
9. Locate and mark parts or pieces of evidence that may be located away from the primary site.
10. List distance and direction of evidence for wreckage distribution diagram.
11. Do not release mishap information.
12. Obtain mishap weather.
13. Prepare for arrival of Investigation Team.

*NOTE: Items for LRD/RTLS or GOM/EOM

c. On-site ground support required on MIT arrival

1. Site security/badges for team members to provide access to the investigation site.
2. Team living accommodations.
3. Working facilities, communications.
4. Tools, lighting, scaffolding, etc.
5. Possibly an area for reconstruction of debris.

4.0 TEAM ACTIVATION

The MIT may be called up for any mishap involving the Orbiter during the launch sequence, any landing contingency, or during the return of the Orbiter to the KSC MDD. A mishap during a TAL landing is considered most probable and the team is geared specifically for this event. For an early return anywhere in the world, because of in-flight problems or an EOM incident, the MIT will be more geographically scattered than during launch. Transportation to the Orbiter location may need to be planned in real-time for each member of the team. Some MIT members may need to travel via commercial air.

This section defines the notification process and transportation planning for MIT members. No aircraft will be held to await the arrival of any MIT member. Refer to Paragraph 5.0 for checklist of items to accomplish in preparation for activation.

4.1 TAL MISHAP

If a TAL landing is made, the MIT will travel to the TAL site on a C-141 aircraft with the RRT from KSC. The C-141 will arrive at KSC from a standby location at about L+6 hours. After loading (L+10 hours), the C-141 should depart at about L+11 hours. The journey to Spain or Africa would take about 10 hours, 30 minutes.

Persons already at KSC are expected to obtain their own transportation to the SLF. Because of limited parking space, cars shall not be left at the SLF.

For the MIT members at JSC, the FCOD KC-135 CRT aircraft may be available to carry the CRT and the MIT to KSC. This must be verified before each flight. If it is available, it will be on standby at EFD on launch day. If an incident occurs, it will depart at approximately L+3 hours with the CRT and JSC MIT members. The KC-135 will arrive at KSC at about L+5 hours. The CRT will continue in the KC-135 to the location of the Orbiter flight crew and return them to JSC. If the KC-135 is not available, a DOD C-141 or another KC-135 will be placed on standby for the event of a TAL landing. If required, the C-141 would fly to KSC and pick up the CRT and then depart to pick up the crew.

Persons who are not at KSC and who cannot get to KSC in time to make the C-141 are expected to get to the TAL site on their own as soon as they can. They should tell the MIT locator their flight plans and ETA.

4.2 EARLY RETURN MISHAP

After launch most MIT members will disperse to their own NASA centers. If a mishap occurs, the RRT may still travel from KSC to the mishap site on the C-141. DDMS will coordinate on available AMC aircraft on a "best effort" basis, when notified. At JSC, after a nominal MECO, the KC-135, if it is available, will respond to a 6-8 hour response time for the CRT. Depending on the departure time of the C-141 from KSC, MIT members at JSC may still be able to travel in the KC-135 to KSC and meet the C-141. Team members at other centers may have to make their own travel arrangements to the landing site. They should tell the MIT locator their flight plans and ETA.

4.3 END OF MISSION MISHAP

If a mishap occurs at the planned EOM site, the RRT and the CRT will not need to travel (they are already there). The KC-135, if it is available, will respond in 6-8 hours to carry the MIT members at JSC to the mishap site. MIT members not at the planned EOM site must arrange their own transportation to the site.

If the landing occurs at an alternate EOM site, the RRT may have to travel to that site. If so, a C-17/C-141 will be sent to pick them up. MIT members may work their own travel arrangements with the RRT if they are in the area. The MIT members at JSC

may use the KC-135 to travel to the mishap site. Other MIT members must make their own transportation arrangements to the site. They should tell the MIT locator their plans.

4.4 LOCATOR SYSTEMS

MIT members are responsible for making known their locations during the mission and ferry timeframes. There are two locators designated by the Manager, Launch Integration, KSC. The Space Shuttle Launch Integration staff office, KSC maintains a locator for the MMT and the MIT during prelaunch and launch through orbit attainment. Thereafter, when the MMT moves to JSC the Space Shuttle Customer and Flight Integration Office, JSC performs the locator functions. MIT members should use the following procedures to provide their locations.

NOTE: It is absolutely essential to notify the locator of your movements, particularly during the prelaunch time.

4.4.1 Prelaunch/Launch through Orbit Attainment

a. MIT members who will be at KSC for launch must notify the MMT locator of their locations following the PMMT Review and each day thereafter until launch. The MMT locator is in the LCC Bldg., (321) 867-3000. The MIT Chair may be contacted through the locator or via (321) 867-3282.

b. In the event of an RTLS, TAL, or AOA, the Manager, Launch Integration will immediately notify the MIT Chair. The Chair is responsible for notifying the team members. Members at KSC will be requested to assemble in the O&C Bldg., Room 1143, (321) 867-2003 as soon as possible.

c. MIT members at JSC or other locations will contact the MMT locator at KSC (321) 867-3000 upon arrival at KSC for further instructions.

4.4.2 Flight/Landing through Crew Egress

a. After launch, the Space Shuttle Customer and Flight Integration Office, JSC will be the MMT/MIT locator at JSC. The locator is in the Customer Support Room, Bldg. 30, Room 236, (281) 483-7995.

b. During this time period and through the end of the ferry mission, all MIT members are required to have a beeper so they may be located rapidly during non-working hours.

NOTE: The beepers may be the only way to locate MIT members. Each member is required to carry a beeper.

c. If an incident occurs, the locator will immediately call the MIT Chair to ensure he is aware of the contingency. The Chair then will call the MIT members and notify them to begin travel preparations and assemble at the appropriate transportation site.

4.4.3 Crew Egress through Ferry

a. After landing, MIT members should notify the Ferry Flight Manager, JSC, (281) 483-1267, during office hours (7:30 - 4:00), of their location. Beepers are required.

b. During the ferry flight itself, the SSVEO, JSC will have a person at EFD in the Operations Room, (281) 244-7256, who can be contacted for location changes. In the event of a contingency, this person will immediately call the MIT Chair.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 5

MISHAP INVESTIGATION TEAM OPERATIONS PLAN

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 5

MISHAP INVESTIGATION TEAM OPERATIONS PLAN

1.0 CHARTER

In the event of a Space Shuttle mishap, the Manager, Launch Integration, activates the MIT. The MIT is chartered to assume responsibility for mishap investigation until a formal MIB is named.

2.0 SCOPE/RESPONSIBILITIES

The MIT, once activated by the Manager, Launch Integration, is tasked to perform the initial investigation and data collection of significant mishaps involving the SSV. Launch, landing, and ferry flight incidents all fall into the scope of MIT involvement.

For Class A mishaps, the NASA Administrator will name a MIB. Naming and convening of the MIB can take several days. The MIT responds quickly to the incident and is given the responsibility of investigating and preserving all evidence pertinent to the incident in preparation for the MIB activation. All evidence associated with the mishap falls under the responsibility of the MIT until relieved by the MIB. This includes on-site investigation and documenting of the incident scene as well as all evidence gathered and impounded by NASA centers, hardware manufacturers, repair stations, and support contractors.

3.0 PROCESS

Upon notification of a Space Shuttle incident, the Manager, Launch Integration will convene the MRT. At that meeting it will be decided whether activation of the MIT is required. Activation of the MIT transfers investigation responsibilities to the MIT Chair. At that time, affected NASA centers will be asked to activate their contingency action plans, if not already activated, and the MIT will deploy to the incident location. Once at the incident location, routine teleconferences will be held with the Recovery Management Team (RMT) chaired by the Manager, Launch Integration.

4.0 MEMBERSHIP

The MIT is composed of a Chair and nine members identified in a letter issued prior to each Shuttle mission. These members include a Chair, astronaut representative, flight surgeon, main propulsion engineer, GOM, military representative from DDMS, Orbiter systems engineer, payload representative, administrative manager, and photographer (reference Figure R-1). With the concurrence of the Manager, Launch Integration, the membership may be supplemented as required by the incident at hand.

5.0 ORGANIZATION

The MIT will initially be divided into four teams:

a. Eye Witnesses and Human Factors Team - Composed of the flight surgeon and astronaut representatives. Their responsibilities will include crew interfaces, obtaining witness statements, human factors, medical issues, and environmental conditions.

b. Site Investigation Team - Composed of the Orbiter Vehicle engineer, payload engineer, and propulsion systems engineer. They will concentrate on investigation and documentation of the vehicle and incident surroundings.

c. MIT Support Team - Composed of the GOM and DDMS representative. Their primary focus will be finding and coordinating the resources required to conduct the investigation.

d. Administration and Photography Team - Composed of the administration manager and the photographer. This team will provide the administrative support, communications interface, photography, documentation, and data management function for the MIT.

The Chair of the MIT may work on any team and has the authority to adjust the team compliment as the situation demands.

6.0 REQUIREMENTS

The MIT members must have the following qualifications:

a. Complete an aircraft accident investigation course.

b. Be physically capable of extended moderate outdoor activity in a variety of terrain and weather conditions.

c. Agree to potentially rapid and extended deployment to an incident location.

7.0 PROCEDURES

The MIT will assume responsibility for the vehicle and incident location as soon as the team is activated. It is understood that crew rescue and the safety of ground personnel takes precedence over any concerns for evidence preservation. Emergency personnel will do whatever is required to rescue the crew and protect ground personnel. The incident area will first be declared stable for investigative activity before MIT investigation of the physical site proceeds. This includes eliminating toxic substances, identification and removal of ordinance, and minimization of other hazards. The MIT will use standard aircraft accident investigation techniques.

The RMT teleconferences will provide management visibility into the progress of the MIT. These teleconferences will also be the forum where impounded assets can be considered for release. Special request of the MIT will be worked through these teleconferences.

The MIT will conduct a preactivity meeting before each workday begins to share findings and coordinate proposed activities. A second meeting will be conducted at the conclusion of each workday to share activities and findings from the day's work. The format of these meetings is outlined in the following agenda.

7.1 MIT PREACTIVITY TAG-UP AGENDA

a. Review of previous day's activities and findings.

   1. Chair
   2. Administrative manager
   3. Site investigators
   4. Eye witness and human factors
   5. Photographer
   6. GOM

b. Identification of request for data, assistance, or equipment.

   1. Chair
   2. Administrative manager
   3. Site investigators
   4. Eye witness and human factors
   5. Photographer
   6. GOM

c. Address issues and answers for RMT teleconference.

d. Plan the activities and priorities for the day.

e. Adjourn.

7.2 MIT END-OF-DAY TAG-UP AGENDA

a. Summary of RMT teleconference.

   1. Administrative manager

   2. Chair

b. Summary of day's activities.

   1. All

c. Identify items needing immediate attention.

   1. All

d. Adjourn.

7.3 MISHAP RESPONSE TELECON

The MIT Chair will participate in a daily MRT. Telecon topics will include, but not be limited to the following:

a. Public Affairs Office

b. Team schedules

c. Investigation status

d. Review of collected and impounded data

e. Medical support

f. Security

g. Photography/data transfer

h. DDMS status

8.0 DATA MANAGEMENT

All information gathered by and for the MIT will be considered sensitive and preserved for MIB evaluation. Included is data collected and impounded at the NASA centers as well as data gathered at the incident location. This consists of, but is not limited to, witness statements, photography, video records, evidence gathered by field teams, electronic and written information pertaining to the incident. The Manager, Launch Integration, will approve release of information after coordination with the MIT Chair. The Manager, Launch Integration is responsible for all press releases and public affairs activities.

9.0 MIT MEMBER RESPONSIBILITIES

9.1 ADMINISTRATIVE MANAGER

The administrative manager will provide administrative support and document the activities and findings of the MIT. The administrative manager will perform the following functions:

a. Act as custodian and keep a list of all impounded data.

b. Act as custodian and keep a list of all equipment removed from the incident site and placed in storage.

c. Keep minutes of all MIT meetings.

d. Act as custodian and keep a list of all interviews.

e. Act as custodian and keep list of all film and video products.

f. Act as the primary point-of-contact for communication with RMT and others requesting MIT information or action.

g. Keep track of all information on hand, pictures, and databases.

h. Document all data request, transmissions, and receptions.

i. Coordinate KSC post-incident facility support.

j. Oversee crash site diagram development.

9.2 ASTRONAUT REPRESENTATIVE

The astronaut representative will be the primary interface with the flight crew.

This includes:

a. Participating in the crew debrief.

b. Retrieving all personal and emergency equipment including suits that were used by the crew.

c. Providing communications with the crew for subsequent questions. The astronaut representative will be the primary resource for the MIT understanding of:

   1. Flight techniques.

   2. Crew normal procedures.

3. Crew emergency procedures.

4. Operation of emergency equipment.

5. Documenting landing aids status.

6. Documenting landing site status.

7. Detail documentation of facility and support resources.

The astronaut representative will assist the flight surgeon in the following:

a. Finding and interviewing eye witnesses.

b. Collecting weather and environmental information. When specific requirements are complete, the astronaut representative will assist the Site Investigation Group (SIG) in documenting the incident scene.

9.3 FLIGHT SURGEON

The flight surgeon will have the following functions in the MIT:

a. Act as group lead for the Operations and Human Factors Group.

b. Identify and interview eye witnesses and others with special knowledge of the incident.

c. Interview the crew.

d. Document all interviews.

e. Act as interface to AFIP or other similar facilities, as required.

f. Ensure that appropriate crew examinations are performed and protected.

g. Ensure that appropriate body fluid samples are obtained and protected.

h. Acquire crew historical information.

i. Identify medical information for collection and impoundment.

j. Research and document medical/human factor considerations.

k. Provide any special equipment beyond that provided by the MIT deploy kit.

9.4 PHOTOGRAPHER

The photographer will be responsible for providing photo documentation of the incident site and subsequent actions to investigate the incident occurrence. This documentation

will take the form of traditional still photography, electronic still photography, and video. It is the responsibility of the photographer to bring adequate equipment and supplies to support seven days of MIT operation.

As a minimum, the following photography will be required:

a. Aerial photography of the incident site.

b. Video of witness statements (when permitted).

c. Video of any movement of the Orbiter or associated debris.

d. Photo documentation of landing associated marks and scars.

e. Photo documentation of specific items of interest requested by MIT investigators.

A photo plan will be discussed at the MIT briefing immediately after arrival at the incident site. Specific photo and video priorities will be established by the MIT Chair. The photographer will carefully document all imagery taken such that the content of all imagery storage media is known. This information will be provided to the administrative manager who is the keeper of all such data. The photographer will be the primary resource for imagery and assigned to the most critical areas for image capture. It is most likely that demands on the photographer's time will be such that other MIT members or support staff will take some video or still imagery. The photographer will be responsible for maintaining the photographic deploy kit and ensuring its transportation to the mishap site.

9.5 GROUND OPERATIONS MANAGER

In the event of a Shuttle mishap at a TAL site, the GOM will already be at the incident location. The GOMs from the other TAL sites will arrive at the landing site on the C-130 aircraft from that site within approximately six hours after landing (this varies due to transit time, etc.). The RRT or the MIT will not arrive for approximately 20 to 24 hours. The following documents actions the GOM can accomplish to aid the MIT in starting its work and also protect and preserve significant information.

a. Safety - In the event of a Shuttle abort or other incident, the number one concern is for the safety of the flight crew and ground personnel. All means necessary shall be used to rescue and protect crew and ground personnel from injury.

b. Security - The GOM should ensure that a security perimeter is set up around the incident scene and restrict entry until the MIT has arrived. The incident scene should remain undisturbed except for those actions necessary to ensure safety or protect evidence which might perish before the MIT arrives.

c. Fire - In the event of a vehicle fire, the GOM should ensure the documentation of all possible details of the fire and actions taken by the fire support personnel which disturb the incident scene. A video camera is the best tool for providing this information.

d. Decontamination - The Orbiter and its payloads contain several toxic substances that may require decontamination activities. At a TAL site, there is no capability in place to decontaminate an incident area other than dilution with water. Decontamination of the flight crew with water, if required, is the only capability. The GOM should identify those substances requiring immediate action and proceed with decontamination of the incident area (i.e., dilution with water to the extent possible). It is critical that these actions be documented and recorded, particularly any activities which disturb the incident area.

e. Preservation - Following flight crew rescue and toxic decontamination, preservation of the accident site is of prime importance. Every effort should be made to preserve the accident scene in its original condition until the MIT arrives. This means that nothing is moved. All pieces of the vehicle should be located, roped off, and protected from further disturbance. Any marks made by the vehicle on the ground, vegetation, buildings, or runway should be identified, roped off, and protected until the MIT arrives.

f. Documentation - Incident scene documentation is of crucial importance. The GOM should ensure that every effort is made to videotape the Orbiter as it arrives at the landing site, any flight crew rescue activity, any fire and decontamination activity, and any details pertinent to the incident that might disappear or change before the MIT arrives.

g. Supporting Data - The GOM should gather and impound all data relevant to the Orbiter approach and landing. This would include but not be limited to:

1. Weather maps, forecast, and observations used for the landing.
2. Procedures.
3. List of personnel present, including how to locate later.
4. List of all eye witnesses, including how to locate later.
5. Operational status of field navigation aids.
6. Recheck and record the status and calibration of all navaids including Precision Approach Path Indicator (PAPI) lights, ball/bar lights, strobes, and runway markers.

h. Facilities - The GOM should acquire the following support for the MIT:

1. Meeting room with board and markers.
2. Secure storage for personal items.
3. Secure storage for impounded materials and hardware.
4. Transportation.

i. Other Support - The GOM should provide for:

1. Identification/security passes.
2. Identify resources for tools, lighting, scaffolding.
3. Communications (audio, video, data transfer).
4. Living accommodations.
5. Food, water, hygiene needs.

j. Briefing - The GOM should be prepared to brief the MIT upon arrival. This briefing should summarize the situation as it currently exists, what has been done subsequent to the incident, and what preparations have been made. Once on-site, the MIT will use the GOM as the primary interface for investigation support resources.

9.6 SITE INVESTIGATION GROUP

The primary role of the SIG is to document the physical evidence at the incident site. Information gathered at the incident site will be forwarded to the MIB and will play a key role in determination of incident cause and scenario. It is of critical importance that the information gathered by the SIG be accurate and untainted. A plan to accomplish this task and progress towards that plan will be discussed at regular MIT tag ups and approved by the MIT Chair.

a. The SIG leader is responsible for:

1. Safety of those within the incident site
2. Developing a map of the incident site with crash distribution diagram
3. Identifying and mapping all evidence pertinent to the incident
4. Preserving evidence until properly documented
5. Directing photography and video within the evidence boundaries

6. Developing a scenario of vehicle travel at the incident site
7. Identifying items requiring further laboratory testing
8. Gathering samples of all fluids

b. The Orbiter System Engineer is responsible for:

1. Acting as group leader
2. Providing documentation and expertise pertaining to the Orbiter Vehicle

c. The Payload Systems Engineer is responsible for:

1. Participating as a team member on the Site Investigation Team
2. Providing documentation and expertise pertaining to the payloads on the vehicle

d. The Propulsion Systems Engineer is responsible for:

1. Participating as a team member on the Site Investigation Team
2. Providing documentation and expertise pertaining to Orbiter main engines

9.7 DDMS SUPPORT

The DDMS will support in accordance with Turnaround Functional Plan 3611-97.

10.0 FIRST ACTIONS

Immediately upon MIT activation, the following items should be accomplished. All center contingency action plans should be activated to the extent appropriate for the incident at hand. Each center should name a point-of-contact and pass that name, e-mail, beeper, and phone number along to the MIT Administrative Manager. Each center should proceed with their respective contingency action plans.

a. KSC

1. Impound processing flow information associated with the incident vehicle, including NASA Shuttle Logistics depot and contractor data.
2. Take samples of all fluids loaded on the vehicle and proceed with their analysis.
3. Impound all electronic data recorded during the launch flow.
4. Impound all pertinent information within the LCC during the launch process.

5. Identify and impound all photographic and video information associated with the incident vehicle.

6. Interview witnesses.

b. JSC

1. Impound MCC information and electronic data associated with the incident.

2. Collect and impound all crew training, crew medical records, MCC tapes, FRR, L-2 and L-1 data.

3. Confirm KC-135 ready to support and MIT GO kit and photographer GO kits are loaded for transportation to KSC.

4. Interview witnesses.

c. MSFC

1. Collect and impound all processing and testing data for the engines, tank, and SRBs associated with the incident vehicle. This includes test stand data.

2. Impound the engine engineering data downlinked during ascent.

3. Interview witnesses.

d. DFRC

1. If the incident is not at DFRC, then coordinate with KSC to identify items that will need transfer to the incident site.

2. If incident is at DFRC:

(a) Rope off and protect Orbiter and incident area.

(b) Collect and impound all video, radar tapes, meteorological data and tapes, tapes of traffic on Shuttle Air to Ground frequencies.

(c) Interview witnesses.

11.0 INTERVIEWS (APPLICABLE TO THOSE INTERVIEWING WITNESSES)

a. Who

1. Crew

2. Air Traffic Control controllers

3. MCC controllers

4. Eye witnesses

b. Locating (there are several sources for identifying potential interviewees)

1. Work schedules

2. Law enforcement

3. News media

4. Advertisement in papers

5. Other witnesses

c. When: Interviews should be accomplished as soon as possible. Memories fade or get distorted by other events. The first interview should be done with as little delay as possible. Subsequent or follow up interviews are permissible for clarification.

d. Where: Attempt to interview witnesses at the location where they viewed or experienced the incident.

e. How

1. Remember this is an interview, not an interrogation.

2. Inform person of their rights and the purpose of the interview.

3. Attempt to isolate witnesses before interview.

4. Only interview one person at a time.

5. Be friendly.

6. Ask for permission to record the interview.

7. Interview one-on-one, so as not to intimidate.

8. Avoid jargon and acronyms.

9. Ask general open-ended questions.

10. Listen.

11. Do not assist or correct witness.

12. Tolerate silence.

13. Use a model aircraft as a talking and demo example.
14. Observe non-verbal communications.
15. Avoid telephone interviews.
16. Ask about sounds, smells, and feelings.
17. Questions should progress from the very general to the more specific.
18. Consider playing the tape back for the witness.
19. Thank witness for their cooperation.

THIS PAGE INTENTIONALLY LEFT BLANK

WITNESS STATEMENT WORKSHEET

Name: _____ Age: ____ Date: _____

Time: _____

Address: _____ City: _____ State: _____

SSN Number: _____ Home Phone: _____

Employer: _____ Work Phone: _____

I have been advised that I am not under oath, and the sole purpose of this investigation is to determine all factors relating to the mishap in order to prevent reoccurrence. Flight mishap reports or extracts are not used to establish guilt, negligence, pecuniary liability, or to provide a basis for disciplinary action.

Signature of Witness: _____ Date: _____

Flying experience (hours or years, crew position):

Exact location and time when witness observed mishap:

What first attracted attention of witness to the aircraft:

What did the witness observe (see, hear, smell, feel, use memory jogging questions):

MEMORY JOGGING QUESTIONS

Estimate Aircraft Altitude (feet): _____ Speed (kts or mph): _____

Attitude: Nose (up or down):_____ Roll (left or right): _____

Yaw (left or right): _____

Flight path (direction, rolling, tumbling, falling):

Fluids leaking:

Sounds:

Fire: (size, color, location, when):

Smoke: (amount, color, location):

Did anything fall from aircraft:

Did anyone bail out:

Landing gear position:

Flap position:

Body flap position:

Rudder speedbrake position:

WEATHER

Wind direction: _____ Velocity: _____ Dew Point: _____

Visibility (feet or miles):_____ Ceiling (feet):_____ Temperature (C or F): _____

Conditions (clear, fog, rain): _____

Thunderstorms (size, distance): _____

Position of survivors or bodies at crash: _____

Items removed from crash site: _____

By whom: _____

Other witnesses present? (Names and descriptions if yes):

Additional comments:

Section 1

MIT Member Preparation

(Applicable to all MIT members.)

_____1. Keep a current passport.

_____2. Complete appropriate training.

_____3. Notify locator system of location and contact number.

_____4. Read and understand MIT plan.

_____5. Keep physical and medical requirements current.

_____6. Be prepared for rapid deployment.

Section 2

Post MIT Activation Actions

(Applicable to all MIT members.)

_____1. Contact MIT administrative person for schedules.

_____2. Notify supervisor of activation.

_____3. Transfer duties to alternates.

_____4. Assure proper personal clothing for investigation.

_____5. Assure proper medical considerations (personal medications).

_____6. Assemble investigative support material.

Section 3

Chair's Checklist

(Applicable to MIT Chair.)

Post-Activation

_____1. MIT member notification complete.

_____2. Team deployment instructions complete.

_____3. Initial security considerations confirmed.

_____4. Investigation kit deployment verified.

_____5. Mobile command post kit deployment verified.

_____6. Special communications requirements coordinated.

Initial Site Visit

_____1. Accident site.

_____a. MIT safety requirements established and in work.

_____b. Security requirements established and in place.

_____c. Accident site secured.

_____2. Search and rescue coordination complete (if applicable).

_____3. MIT pre-site visit tag-up meeting complete.

_____4. Coordination with other individuals/teams established.

_____5. Management tag-up requirements/communications in place.

_____6. Investigation kit available.

_____7. Teams established and briefed.

_____8. Special evidence recovery/protection provisions complete.

_____9. Wreckage recovery/protection requirements established.

____10. Priorities established.

____11. Confirm communications setup.

____12. Confirm photography kit is on-site and ready for use.

____13. Perform initial walk through of incident site.

Daily Activity

_____1. Safety/hazards concerns identified, discussed and minimized.

_____2. Previous day's operations and findings documented.

_____3. Daily MIT plans established.

_____4. Daily photographic plan established.

_____a. Initial photo coverage during first site visit.

_____b. Detailed photo coverage including evidence identification number, scale, location, and identification (if known).

_____c. Complete photo logs are maintained.

_____d. Evidence recovery and salvage recovery photos complete.

_____5. Special requirements and needs identified.

_____a. Consultant/specialist identified.

_____b. Interface requirements with other teams/individuals.

_____c. Interface requirements with other agencies (FAA, National Transportation Safety Board).

_____d. Medical requirements (individual or crew).

_____6. Review accident diagram and parts log status.

_____7. Review wreckage/evidence recovery and protection status.

_____8. Management tag-up subjects established.

_____9. Assure accident report index is concise and each section is assigned to a MIT member.

____10. Review all recovered evidence and its preservation.

____11. Assure that accident site salvage and recovery is properly carried out (especially if reconstruction is necessary).

____12. Review witnesses interview and identification status.

____13. Review special tests and analyses requirements and progress.

____14. Assure evidence chain of custody integrity is maintained.

Section 4

Administrative Checklist

(Applicable to Administrative Manager.)

Post-Activation

_____1. MIT member notification complete.

_____2. Team deployment instructions complete.

_____3. Initial security considerations complete.

_____4. Investigation kit deployment verified.

_____5. Special communications requirements coordinated.

_____6. Other agency/department interface and communications complete (if required).

Initial Site Visit Activities

_____1. MIT member travel coordination complete (if required).

_____2. MIT member accommodations verified (if required).

_____3. Verify investigation kit availability and deployment.

_____4. MIT pre-site visit tag-up meeting coordination complete.

_____5. Coordination with other teams/individuals established.

_____6. Local officials interface established (if required).

_____7. MIT investigation operations room established.

_____8. Secure evidence assimilation facility.

_____9. MIT safety and protective equipment distribution complete.

Daily Activity

_____1. Coordinate daily MIT tag-up meeting.

_____2. Record minutes of daily MIT tag-up meeting.

_____3. Coordinate daily management briefing.

_____4. Record minutes of daily management briefing.

_____5. Coordinate all outgoing and incoming communications and data transfers.

_____6. Establish and maintain MIT master document file.

_____7. Manage investigation kit inventory control.

_____8. Coordinate MIT member administrative requirements.

_____9. Maintain master photographic file and log.

____10. Coordinate accident site diagram and evidence log.

Detailed Administrative Activity

_____1. Assure photographs and photo logs complete.

_____2. Assure accident site diagram and evidence ID log complete.

_____3. Manage evidence chain of custody documentation.

_____4. Assure that all MIT members administrative needs are met.

_____5. Coordinate MIT personnel logistical functions.

_____6. Document all MIT activities and meetings.

Section 5

Site Investigator Checklist

(Applicable to Site Investigation Team.)

Initial Activities

_____1. Assure site is safe for MIT entry.

_____2. Attend initial investigation MIT tag-up meeting.

_____a. Develop understanding of accident scenario.

_____b. Determine extent of human injury or fatalities.

_____c. Ascertain personal safety issues at the accident scene.

_____d. Understand priorities of first accident site visit.

_____3. Develop preliminary assessment scenario at the time of the accident.

_____4. Develop preliminary configuration at the time of the accident.

_____5. Develop preliminary assessment of the environment preceding accident.

_____6. Identify necessary design and operations data for systems involved in accident.

_____7. Brief MIT members, security personnel, and others regarding systems safety considerations at accident site.

Detailed Systems Activities

_____1. Review safety considerations each day before site entry.

_____2. Assure that systems are safe for approach and analysis by personnel.

_____3. On first site visit, become familiar with accident scene.

_____4. Develop preliminary accident scenario.

_____5. Map the incident area and component locations.

_____6. Perform wreckage/component identification, tagging, and cataloging on accident site diagram.

_____7. Assure adequate photographic documentation.

_____8. Obtain necessary design and operations data for systems involved in the accident.

_____9. Assess systems contribution to accident survivability.

____10. Assist in evidence/wreckage removal from accident site to assure proper handling.

____11. Assist in systems reconstruction (if required).

Section 6

Human/Medical Factors Group

(Applicable to those interviewing eye witnesses.)

Detailed Activity

_____1. Assimilate complete list of witnesses.

_____2. Expeditiously conduct Interview of all witnesses.

_____3. Review interview results with MIT members.

_____4. Conduct follow-up interview (if required).

_____5. Record or videotape interviews (when permitted).

Landing/Incident Site Data Collection

(Applicable to Astronaut Representative.)

_____1. Determine status of landing aids before and after incident.

_____2. Acquire recording of voice traffic on Shuttle air ground frequencies.

_____3. Acquire copy of detail weather forecasts and observations prior to and after incident (this includes radar and satellite information).

_____4. Acquire a detail map of the incident area including dimensions, locations, and altitudes.

_____5. Acquire a detail summary of all traffic in the area at time of incident.

_____6. Obtain repair history and calibration history of landing aids.

_____7. Document runway conditions and repair status.

_____8. Document status of field emergency equipment before and during incident.

_____9. Document position of all key elements during the incident.

____10. Acquire radar tape of the approach and landing time frame.

Human and Medical Factors

(Applicable to Medical/Human Factors Group.)

_____1. Assure that AF Form 711gA or equivalent is completed on each crew member.

_____2. Assure that all crew clothing and emergency equipment is impounded.

_____3. Assure that all appropriate body fluid samples are obtained and impounded.

_____4. Obtain statements from all crew members.

_____5. Assure that appropriate pathological and physiological exams are completed and data impounded.

_____6. Assure that all crew historical medical information is collected and impounded.

_____7. Document rescue activities.

Mishap Investigation Team
Investigator's Checklist

Shuttle Flight No.	Shuttle Orbiter	Flight Phase	Orbiter Location	# Flight Crew Onboard	Number Injured	Number Fatal
_____	_____	_____	_____	_____	_____	_____

Launch Date and Time:	Accident/Incident Date and Time:
Date: _____ Time: _____	Date: _____ Time: _____

Vehicle Damage	Vehicle Fire	Explosion	Damage to Property
None ____	None ____	None ____	Government Property ____
Minor ____	In-Flight ____	In-Flight ____	Private Property ____
Major ____	On Ground ____	On Ground ____	Commercial Property ____
Destroyed ____	Other ____	Other ____	Vehicles (s) ____
			Other _____

Weather Conditions	Light Conditions	Sky/Cloud Conditions	Lowest Ceiling	Precipitation
Visual ____	Dawn ____	Clear _____	None _____	None ____
Instrument _____	Daylight ____	Scattered _____	Broken _____	Light ____
	Dusk ____	Thin Brkn _____	Overcast ____	Mod _____
	Night ____	Thin Ovcst ____	Obscured ____	Heavy ____
		Part. Obscured _____		
		_____ Feet AGL		

Visibility	Temperature	Wind	Altimeter	Density Altitude	Dew Point
_____ SM	_____ Deg F	Dir: ___ Deg	_____ In Hg	_____ Ft.	_____ Deg F

Orbiter Accident/ Incident Location:

Latitude: _____ **Longitude:** _____

Location Description:

Mishap Investigation Team
Investigator's Checklist

Accident Kinematics

Flight Phase:		
	Launch ____	Primary Landing Site ___
	RTLS ____	Alternate Landing Site ___
	TAL ____	Emergency Landing Site ____
	AOA ____	Ferry Flight ____
	Other ____	Specify Site: _____

Impact Sequence
(Number in order of Occurrence)

Trees ____	Fresh Water ____	Runway ____
Power Lines ____	Dirt ____	Taxi Way ____
Brush ____	Clay ____	Overrun ____
Building ____	Sand ____	Roadway ____
Vehicle ____	Rocks ____	Ramp ____
Aircraft ____	Gravel ____	Other ____
Rock Face ____	Salt Water ____	Unknown ____
Lights ____	Road ____	None ____

Airspeed	**Flight Path Angle**
Estimated: _____ Knots	Estimated: _____ Degrees
Unknown _____	Unknown _____

Pitch Attitude	**Roll Attitude**	**Yaw Attitude**
Up ____	Right wing down _____	Left ____
Down ____	Left wing down ____	Right ____
_____Degrees	_____Degrees	_____Degrees
Unknown ____	Unknown ____	Unknown ____

Sketch and Dimensions of Initial Impact Marks:

Mishap Investigation Team
Investigator's Checklist

Wreckage Documentation

Landing Gear Position	**Nose Gear** Up ____ Down ____ Intermediate ____ Undetermined ____	**Left Main Gear** Up ____ Down ____ Intermediate ____ Undetermined ____	**Right Main Gear** Up ____ Down ____ Intermediate ____ Undetermined ____	
Destroyed Landing Gear Damage		**Destroyed**	**Major**	**Minor**	**None**
	Nose	____	____	____	____
	Left Main	____	____	____	____
	Right Main	____	____	____	____
Elevon Surface Position	**Left Outboard** Position ____ Deg Unknown ____	**Left Inboard** Position ____ Deg Unknown ____	**Right Inboard** Position ____ Deg Unknown ____	**Right Outboard** Position ____ Deg Unknown ____
	Indicate Fire or Impact Damage			
Elevon Surface Damage	**Left Outboard** Destroyed ____ Major ____ Minor ____ None ____	**Left Inboard** Destroyed ____ Major ____ Minor ____ None ____	**Right Inboard** Destroyed ____ Major ____ Minor ____ None ____	**Right Outboard** Destroyed ____ Major ____ Minor ____ None ____
Rudder Surface Position & Damage	**Rudder** Neutral ____ Left ____ Deg Right ____ Deg Unknown ____	**Speedbrake** Stowed ____ Deployed ____ Deg Unknown ____	**Indicate Impact/Fire Damage** Destroyed ____ Major ____ Minor ____ None ____	
Body Flap Position & Damage	**Position** Neutral ____ Deployed ____ Unknown ____	**Indicate Impact/Fire Damage** Destroyed ____ None ____ Major ____ Minor ____		
OMS Pod Damage	**Left Pod** Separated ____ Attached ____ Indicate Impact/Fire Damage Destroyed ____ Major ____ Minor ____ None ____	**Right Pod** Separated ____ Attached ____ Indicate Impact/Fire Damage Destroyed ____ Major ____ Minor ____ None ____		
Payload Bay Door Damage	**Left Forward** Separated ____ Attached ____ Destroyed ____ Major ____	**Left Rear** Separated ____ Attached ____ Destroyed ____ Major ____	**Right Forward** Separated ____ Attached ____ Destroyed ____ Major ____	**Right Rear** Separated ____ Attached ____ Destroyed ____ Major ____

Mishap Investigation Team
Investigator's Checklist

Wreckage Documentation

Indicate fire/Impact Damage

Vertical Stabilizer Damage	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Aft Fuselage Damage	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Mid Fuselage Damage	Attached _____ Separated _____	Destroyed _____ Minor ____	Major _____ None _____
Wings Left Wing	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Right Wing	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Forward Fuselage	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Forward RCS Module	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Crew Cabin	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Payload Damage			
Payload 1	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Payload 2	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____
Payload 3	Attached _____ Separated _____	Destroyed _____ Minor _____	Major _____ None _____

Mishap Investigation Team
Investigator's Checklist

Wreckage Documentation

Indicate Impact / Fire

Main Engine Damage

Engine #1	S/N _____	Destroyed _____	Major _____
	Attached _____	Minor _____	None _____
	Separated _____		
Engine #2	S/N _____	Destroyed _____	Major _____
	Attached _____	Minor _____	None _____
	Separated _____		
Engine #3	S/N _____	Destroyed _____	Major _____
	Attached _____	Minor _____	None _____
	Separated _____		

Airframe / Structure Evidence of Inflight Breakup (List parts Separately)

Description	Location	Condition when found

Mishap Investigation Team
Investigator's Checklist

Medical Injury Summary

NAME	Location or Seat Occupied	Degree of Injury				Injury Description
		Fatal	Serious	Minor	None	
1.						
2.						
3.						
4.						
5.						
6.						
7.						

Mishap Investigation Team
Investigator's Checklist

Cockpit Instruments

NAV /COM Equipment		Miscellaneous	
Item	**Reading / Setting**	**Item**	**Reading / Setting**

Mishap Investigation Team
Investigator's Checklist

Cockpit Instruments

Flight Instruments		Engine Instruments	
Item	**Reading / Setting**	**Item**	**Reading / Setting**

Mishap Investigation Team
Investigator's Checklist

Cockpit Switches

Cockpit Panel Number	Switch Description	ON	OFF	OTHER (identify)

Mishap Investigation Team
Investigator's Checklist

Flight Crew Information

COMMANDER

Name (Last, First, Middle)	Address: Street _____ City & State _____

Pilot Certificate No.	Date of Birth	Age	Sex Male _____ Female ___
_____	_____	_____	

Certificates:		Ratings:	
Private ____	Flight Instructor ____	Single Engine ____	Glider ____
Commercial ____	Military ____	Multi-engine ____	Other ____
Airline Transport ____	Other ____	Rotorcraft ____	

Instrument Rating	Instructor Ratings:	
Aircraft _____	Aircraft SE ____	None ____
Rotorcraft _____	Aircraft ME ____	Glider ____
None ____	Rotorcraft ____	Instrument Aircraft ____
		Instrument Rotorcraft ____

Medical Certificate	Medical Certificate Exceptions	Last Medical
Class 1 ____	Valid medical - No Waivers ____	Date: _____
Class 2 ____	Valid medical - w/waivers	
Class 3	Expired Medical ____	
	Other ____	
	Waivers/Limitations _____	

Flight Time	All A/C	Shuttle	Aircraft SE	Aircraft ME	Night	Instrument	Rotor
Commander							
Pilot							
PIC							
Instructor							

Training:	**Total**	**Last 6 Months**	**Last 90 Days**	**Last 30 Days**
STA				
SMS				
Other				
A/C Simulators				

Mishap Investigation Team
Investigator's Checklist

Flight Crew Information

PILOT

Name (Last, First, Middle) _____

Address:
Street _____
City & State _____

Pilot Certificate No.	Date of Birth	Age	Sex
_____	_____	____	Male ____ Female ___

Certificates:
Private ____ Flight Instructor ____
Commercial ____ Military ____
Airline Transport ____ Other ____

Ratings:
Single Engine ____ Glider ____
Multi-engine ____ Other ____
Rotorcraft ____

Instrument Rating
Aircraft _____
Rotorcraft _____
None ____

Instructor Ratings:
Aircraft SE ____
Aircraft ME ____
Rotorcraft ____

None ____
Glider ____
Instrument Aircraft ____
Instrument Rotorcraft ____

Medical Certificate
Class 1 ____
Class 2 ____
Class 3

Medical Certificate Exceptions
Valid medical - No Waivers ____
Valid medical - w/waivers
Expired Medical ____
Other ____
Waivers/Limitations _____

Last Medical
Date: _____

Flight Time	All A/C	Shuttle	Aircraft SE	Aircraft ME	Night	Instrument	Rotor
Commander							
Pilot							
PIC							
Instructor							

Training:	Total	Last 6 Months	Last 90 Days	Last 30 Days
STA				
SMS				
Other				
A/C Simulators				

Mishap Investigation Team
Investigator's Checklist

Flight Crew Information

MISSION SPECIALIST

Name (Last, First, Middle) _____	Address: Street _____ City & State _____		
Pilot Certificate No. _____	**Date of Birth** _____	**Age** _____	**Sex** Male _____ Female ____

Certificates: Private ____ Flight Instructor ____ Commercial ____ Military ____ Airline Transport ____ Other ____	**Ratings:** Single Engine ____ Glider ____ Multi-engine ____ Other ____ Rotorcraft ____

Instrument Rating Aircraft _____ Rotorcraft _____ None ____	**Instructor Ratings:** Aircraft SE ____ Aircraft ME ____ Rotorcraft ____	None ____ Glider ____ Instrument Aircraft ____ Instrument Rotorcraft ____

Medical Certificate Class 1 ____ Class 2 ____ Class 3	**Medical Certificate Exceptions** Valid medical - No Waivers ____ Valid medical - w/waivers Expired Medical ____ Other ____ Waivers/Limitations _____	**Last Medical** Date: _____

Training	Total	Last 6 Months	Last 90 Days	Last 30 Days
Mission Simulators				
WETF				
A/C Simulators				
Other				

COMMENTS:

Mishap Investigation Team
Investigator's Checklist

Seats	Location when examined	Seat damage
Seat Position	Inside Veh. Attached _____	Destroyed ___
CDR _____	Inside Veh. Separated _____	Major _____
Pilot _____	Outside Vehicle _____	Minor _____

Description of seat damage including rails:

Restraint System In use ? YES_____ NO _____

	Damage Severity				Damage Cause	
	None	Minor	Major	Destroyed	Impact	Fire
Lapbelt						
Shoulder Harness						
Inertia Reel						
Release Assembly						
Webbing & Stitching						
Restraint Attach Fittings						

Mishap Investigation Team
Investigator's Checklist

Human Interfaces

Emergency Oxygen System Activated ?	**YES** ____	**NO** ____	**Undetermined** ____
Emergency Egress System Activated ?	**YES** ____	**NO** ____	**Undetermined** ____
Egress Hatch Jettisoned?	**YES** ____	**NO** ____	**Undetermined** ____
Escape Pole Deployed ?	**YES** ____	**NO** ____	**Undetermined** ____
Did Seat Occupants Attempt Escape?	**YES** ____	**NO** ____	**Undetermined** ____
Was Escape Successful?	**YES** ____	**NO** ____	**Undetermined** ____

If escape attempt was unsuccessful describe Circumstances:

Ground Emergency Egress Attempted?	**YES** ____	**NO** ____	**Undetermined** ____
Evidence of Onboard Fire?	**YES** ____	**NO** ____	**Undetermined** ____
Evidence of Toxic impairment?	**YES** ____	**NO** ____	**Undetermined** ____
Evidence of Hypoxia?	**YES** ____	**NO** ____	**Undetermined** ____

Describe other human factor/interface observations:

Mishap Investigation Team Support Equipment

Equipment	Total	EFD Kit	MIT Kit
Parts Tags (w/ string or wire)	250	100	150
Bags (plastic assorted sizes)	250	100	150
Compass (magnetic)	2	1	1
Inclinometer	1		1
Magnifying Glass (pocket size 4X)	2		2
Flashlights (w/ spare bulbs)	5	1	4
Batteries (size used by flashlights)	50		50
Inspection mirror	1	1	
Surgical masks	100		100
Pens, pencils	12	12	
Graph paper (8 1/2 X 11)	5 pads	1	4
Spiral notebooks	10		10
Markers (indelible ink)	12	12	
Tape measure (100ft)	1	1	
Tape measure (12ft)	3	1	2
Magnet (small pocket type)	2		2
Stakes (wood or metal) 3ft long	20		20
Rope (nylon 1/4")	500 ft		500 ft
String (nylon or equiv)	1000 yds		1000 yds
Tape (grey, masking, shipping)	2 rolls ea.	2	
Walkie talkie (w/ batteries & charger)	5		5
Voice recorder (w/ 50 hours of tape)	5		5
Sample containers (fluid)	25	10	15
Hard hats	4		4
Rubber gloves (surgical)	200 pr		200 pr
Cameras and Video Equipment	n/a		Photog Kit
Portable (personal) GPS unit	1		1
Laptop Computer	2		2
Hand tools (small assortment)		assorted	
Personal Needs	**Total**	**EFD Kit**	**MIT Kit**
Identification	25		25
Sun screen	10		10
Insect repellant	10	4	6
First Aid Kit	1	1	
Protective clothing (Orange Flight Suits)	10		10
Gloves (Leather)	9	9	
Biohazard Protective Suits	10		10

Mishap Investigation Team Support Equipment - Concluded

Additional Support Items	Total		MIT Kit
Handheld Video Camera	4		4
Handheld Digital Camera	1		1
Satellite Telephone	1		1
Scanner	1		1

45. OMI S0029, Post-landing Operations - TAL/CLS - Moron
46. OMI S0039, Post-landing Operations - TAL/CLS - Banjul
47. OMI S0055, Post-landing Operations - TAL/CLS - Ben Guerir
48. OMI S0061, Post-landing Operations - ELS
49. NSTS 08934, Shuttle Operations Data Book, Volume IV, Part 1, Orbiter Landing
50. Emergency Rescue Data
51. JSC 13956, Medical Operations Requirements Document
52. JSC 16299, STS Medical Operations Support Implementation Plan - WSSH
53. JSC 18288, STS Medical Operations Support Implementation Plan - DFRF
54. JSC 22944, KSC Medical Operations Support Implementation Plan - Ben Guerir
55. JSC 22945, KSC Medical Operations Support Implementation Plan - Moron Air Base
56. JSC 22946, KSC Medical Operations Support Implementation Plan - Zaragoza Air Base
57. JSC 22947, KSC Medical Operations Support Implementation Plan - Banjul
58. TAL Orbiter Recovery Plan
59. MSFC-SSCP-5-77, Space Shuttle Contingency Plan
60. AHB-8621-1, Ames Research Center/Dryden Flight Research Facility Shuttle Contingency Action Plan

THIS PAGE INTENTIONALLY LEFT BLANK

21. K-SF-0005.7, National Resource Protection Plan for KSC

22. K-SM-17, KSC Space Shuttle Offsite Landing and Ferry Management Plan

23. KBM-PL-0001.1, KSC Medical Operations Support Implementation Plan

24. KBM-PL-1.2, Emergency Medical Services Plan

25. KHB 1711.1, Reporting and Investigation of Mishaps

26. KDP-KSC-P-1450, NSTS Contingency Action Plan for KSC

27. K-RQ-0001.5, Orbiter Ground Operations Safety Plan - Post-landing Activities, Augmented Landing Sites

28. KSTM-09.3.02, KSC NSTS Data Impoundment and Handling Plan

29. Generic Security Plan for Space Shuttle (OV) Landing (Sites) Airfields

30. AFS-P-0001, KSC Aircraft Control Plan

31. DRL 017 to Contract NAS10-1090 (SFOC), Plans, Contingency and Operational Agreement between the DOD and NASA for Joint Investigation of Aircraft or Space System Mishaps

32. DOD Manager's Space Shuttle Support Procedures Document

33. DOD Manager's Contingency Functional Plan 3160

34. DOD Manager's Contingency Turnaround Functional Plan 3611

35. ESMC Operations Directive (OD) No. 001, Search and Salvage

36. ESMC Operations Directive (OD) No. 004, ESMC Contingency Support

37. SGS-5520364, Off-SLF Contingency Flight Crew Rescue

38. SGS-5520365, Flight Crew Emergency Contingency Operational Procedures

39. SGS Security SOP No. 431-011, Offsite Support

40. SGS Security SOP No. 433-058, STS Offsite Mishap Plan

41. SGS Security SOP No. 434-057, Mode 6 (On SLF Mishap)

42. OMI S0026, Post-landing Convoy Operations - DFRF

43. OMI S0027, Post-landing Convoy Operations - WSSH

44. OMI S0028, Post-landing Convoy Operations - KSC

APPENDIX R, ATTACHMENT 10

REFERENCED DOCUMENTS

1. NMI 1382.3, Release of Accident Investigation Reports to the Public
2. NMI 1382.4, Release to the News Media of Information Concerning Accidents and Casualties
3. NPD 8621.1, Mishap Reporting and Investigation Policy
4. NHB 1700.1 (Volume I-A), Basic Safety Manual
5. NHB 1700.1 (Volume II), Guidelines for Mishap Investigation
6. NHB 2710.1, Safety and Health Handbook, Occupational Safety and Health Programs
7. NASA Headquarters OSF SFO Contingency Action Plan
8. NSTS 07700, Volume X
9. NSTS 08218, Intercenter Photographic and Television Analysis Contingency Action Plan
10. STS Public Affairs Contingency Plan
11. K-STSM-09.3.1, KSC Operations Plan, Flight and Ground Crew Rescue
12. K-STSM-12.4, KSC Transportation Plan
13. K-STSM-12.4.1, KSC Offsite Transportation Plan
14. USA-GO-0021, KSC Offsite Operations Plan
15. SFOC-GO-0022, Convoy Operations Plan
16. KVT-PL-0016, STS Operations Plan, Shuttle Emergency OTV
17. SFOC-GO-0014, KSC NSTS Salvage Plan
18. KVT-OI-0001.A, Operations Instructions
19. KVT Index of Effective Documents
20. K-SF-0003.4, Contingency Plan for STS Launch, RTLS Landing Mishap, KSC Offsite

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 10

REFERENCED DOCUMENTS

THIS PAGE INTENTIONALLY LEFT BLANK

1.3 EMS TRANSPORTATION

The launch/landing/recovery sites shall provide adequate numbers of EMS vehicles and staff to stabilize and transport ill or injured flight crew members from the scene.

Helicopters are required as the primary means of EMS transportation at CONUS sites. Ground transportation may be substituted if the transport time of the patient from the recovery site to the medical care facility is equal to or less than the time required for air transport. Helicopters designated for SAR functions at KSC must have a man-rated hoist for land or water rescue capability. Fixed-wing aircraft will be used for SAR/MED-EVAC functions at overseas sites. Ambulances shall be used as a secondary means of EMS transportation.

1.4 ACCESSIBILITY TO CARE

The on-scene physician (triage doctor) will make a triage assessment of the flight crew/support personnel, and will determine the mode of transport for each. Flight crew status will be relayed by the triage doctor to the site EMS coordinator.

The site EMS coordinator shall plan, coordinate, and direct site EMS personnel to assure prompt treatment for each ill or injured flight crew member. Prior arrangements (by agreement, contract, etc.) shall be made to assure access to DMCFs and IMCFs and MOSIPs submitted to the JSC Chief, Medical Operations Branch, shall include the copies of all agreements. Site plans shall specify time(s) en route to medical care facilities via air and ground transportation.

6. One KSC physician and two trauma physicians stationed with the triage team at the MFF.

7. One KSC EMS coordinator stationed in the LCC.

8. One KSC physician and two trauma physicians at the Occupational Health Facility command post.

9. One DOD physician in the SOC.

10. A group of consultants on call and available to the designated DMCF and/or IMCF including, but not limited to:

    (a) Neurosurgery

    (b) Orthopedics

    (c) General surgery

    (d) Anesthesiology

b. Abort Once Around (AOA) site

1. One physician (EMS coordinator) on station one hour prior to launch.

2. One EMT or equivalent per flight crew member aboard each DOD SAR/ MEDEVAC helicopter within aircraft limitations.

3. One DOD physician (Flight Surgeon) per DOD SAR/MEDEVAC helicopter.

4. Two EMTs in each of two ambulances.

5. A group of consultants on-call and available to the DMCF and/or the IMCF including, but not limited to:

    (a) Neurosurgery

    (b) Orthopedics

    (c) General surgery

    (d) Anesthesiology

c. Transoceanic Abort Landing (TAL)

Designated TAL sites for each launch will have two DOD physicians, a nurse, and a medical technician, plus one pararescueman or EMT per flight crew member deployed with the DOD SAR/MEDEVAC aircraft. This includes the augmented contingency site, Banjul, The Gambia.

APPENDIX R, ATTACHMENT 9

EMERGENCY MEDICAL SERVICES

1.0 PURPOSE

This attachment describes more fully the EMS available at the various landing sites.

1.1 DEFINITIONS

a. Emergency Medical Services - Services required to provide flight crew members immediate medical care to prevent loss of life or aggravation of a physical or psychological condition.

b. Emergency Medical Services System - Personnel, facilities, and equipment for the immediate and coordinated delivery of health care services.

c. Intermediate Medical Care Facility - An in-patient medical care facility capable of initial stabilization and treatment of a flight crew member's injuries or illness. Category I and II trauma patients would be transferred to a DMCF. Some Category II and III trauma patients could remain in the IMCF.

d. Definitive Medical Care Facility - An in-patient medical care facility capable of comprehensive diagnosis and treatment of a flight crew member's injuries or illness without outside assistance. A facility capable of care of Category I, II and III trauma patients (American College of Surgeons classification). The DMCF is normally a Level I trauma center, but may be a Level II trauma center depending on regional resources.

1.2 LAUNCH PHASE STAFFING

a. Launch site recovery area and RTLS:

1. One pararescueman or EMT per flight crew member deployed with DOD SAR/MEDEVAC helicopters within aircraft limitations.

2. One DOD physician (Flight Surgeon) per DOD SAR/MEDEVAC helicopter.

3. Two KSC paramedics in each of two ambulances stationed at the Multifunctional Facility (MFF).

4. One JSC physician (Crew Surgeon) stationed with the triage team at the MFF.

5. One JSC Deputy Crew Surgeon stationed in the LCC.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 9

EMERGENCY MEDICAL SERVICES

THIS PAGE INTENTIONALLY LEFT BLANK

forecasts will be provided by SMG. Weather data will be transmitted from the weather office at Zaragoza to JSC by INMARSAT. Handheld UHF radios are provided for convoy personnel.

Refer to KVT-PL-0014, Appendix TBD, Zaragoza AB, Spain for the complete support and turnaround plan.

1.4 BANJUL, THE GAMBIA

Banjul International Airport (BIA), Banjul, The Gambia, due to geographical location, has been identified as a TAL site for low inclination launches to maximize the capability to perform a TAL in the event of in-flight failure of more than one Orbiter main engine. BIA is located approximately 6 miles from the Gambia River and 7 miles from the Atlantic Ocean. Banjul, the capital city of The Gambia is on the western coast of Africa, approximately 100 miles south of Dakar, Senegal. The runway (14/32) is 10,410 ft by 150 ft wide, with 25 ft paved shoulders on both sides and 1,000 ft of overruns.

BIA has a full set of navigational and landing aids on Runway 32 including TACAN, MSBLS, ball/bar lights, PAPI lights, distance-to-go markers, an Orbiter arresting barrier, and Xenon lights for night landings. In addition to landing aid support, NASA and DOD personnel will be in place on launch day to provide Orbiter GSE and towing, communications, medical, fire, crash, rescue, security, and SAR/MEDEVAC support.

Banjul communications consist of three INMARSAT circuits and commercial Gambian telephone circuits. Landing Field Prime 1 is available through the INMARSAT, and a UHF-AG radio system will be used with the INMARSAT to communicate with the Orbiter. An automated weather station is installed that transmits through a communications satellite and a radio frequency link to the operations building. Weather observations will be provided by Gambian observers and DOD personnel. Forecasts for the Orbiter landing will be provided by SMG. Handheld UHF radios are provided for convoy personnel.

Refer to KVT-PL-0014, Appendix B, Banjul, The Gambia, Offsite Operations for the complete support and turnaround plan.

Moron has a full set of navigational and landing aids including TACAN, MSBLS, ball/bar lights, PAPI lights, lighted aim points, distance-to-go markers, and Xenon lights and an Orbiter arresting barrier. The MSBLS, Xenon, and Orbiter arresting barrier are located on Runway 21. In addition to landing aids support, DOD and KSC personnel will be in place on launch day to provide Orbiter GSE and towing, communications, medical, weather observations and flights, fire, crash, rescue, security, and SAR support.

Moron communications consist of three circuits via INMARSAT and available telephone lines. Secure communications are available through the base.

Landing Field Prime 1 is available through the INMARSAT, and UHF-AG through INMARSAT provides communication to the Orbiter and weather aircraft. An automated weather station has been installed that transmits through a communications satellite and also through a telephone to the weather office at Moron AB. Weather observations will be provided by DOD personnel with Orbiter landing forecasts provided by SMG. Weather data will be transmitted by the INMARSAT. Telephone, hardline, or handheld UHF radios are provided for convoy personnel.

Refer to KVT-PL-0014, Appendix C, Moron AB, Spain, Offsite Operations for the complete support and turnaround plan.

1.3 ZARAGOZA AIR BASE, SPAIN

Zaragoza AB, Spain has been identified as the primary TAL site for high inclination launches (51.6 and 57 degrees). Zaragoza AB is a Spanish military airfield. The airfield is located northwest of Zaragoza and has two parallel runways. Runway 30R/12L is 9,923 ft by 197 ft, and is used primarily by Spanish commercial airline traffic. Runway 30L/12R is 12,109 ft by 197 ft, with 1,000 ft overrun, and is used primarily by the Spanish military. Prevailing winds and length make 30L the optimum runway for the Orbiter.

Runway 30L has a full set of navigational and landing aids, including TACAN, MSBLS, ball/bar lights, PAPI lights, lighted aim points, distance-to-go markers, Xenon lights, and an Orbiter arresting barrier. In addition to landing aids support, DOD and NASA personnel will be in place on launch day to provide Orbiter GSE and towing, communications, medical, weather flights and observations, fire, crash, rescue, security, and SAR support.

Zaragoza communications consist of three circuits via INMARSAT, and available telephone lines. Landing Field Prime 1 is available through the INMARSAT, and UHF-AG through the INMARSAT provides communication to the Orbiter weather aircraft. An automated weather station has been installed that transmits through a communications satellite. Weather observations will be provided by DOD personnel and Orbiter landing

APPENDIX R, ATTACHMENT 8

TAL SITES AND TAL COMMUNICATIONS

1.1 BEN GUERIR, MOROCCO

Base Aerienne, Ben Guerir, Morocco has been identified as a TAL site for low inclination launches (28 degrees) and a weather alternate TAL site for high inclination launches (51.6 and 57 degrees). Base Aerienne is a former Strategic Air Command (SAC) base located 36 miles north of Marrakech. Runway 18 is 12,720 ft by 200 ft with 1,000 ft compacted dirt underrun/overruns; and Runway 36 is 13,720 ft by 200 ft with a 1,500 ft overrun and a 1,000 ft underrun.

Ben Guerir has a full set of navigational and landing aids on Runway 36 including a TACAN, Microwave Scanning Beam Landing System (MSBLS), ball/bar lights, PAPI lights, lighted aim points, distance-to-go markers, and Xenon lights. Runway 18 is equipped with visual landing aids and is to be used for daylight use only. In addition to landing aids support, KSC and DOD personnel will be in place on launch day to provide Orbiter GSE and towing, communications, weather observations and C-12 weather observation flights, fire, crash, rescue, medical, security, safety, and SAR/MEDEVAC support.

Ben Guerir communications consist of three INMARSAT circuits and five telephone lines. In addition, an automated weather station has been installed that will transmit through a communications satellite. Weather observations and forecasts will be provided by Moroccan observers and DOD personnel. Weather forecasts will be provided by the JSC SMG. Landing Field Prime 1 is available through the INMARSAT, and two UHF air-to-ground radio systems will be used with the INMARSAT to communicate with the Orbiter and weather aircraft. Hand-held UHF/Frequency Modulation (FM) radios will be used by convoy personnel.

Refer to KSC-KVT-PL-0014, Appendix D, Base Aerienne, Ben Guerir, Morocco, Offsite Operations for the complete support and turnaround plan.

1.2 MORON AIR BASE, SPAIN

Moron AB, Spain has been identified as a weather alternate TAL site for both low inclination (28 and 39 degrees) and high inclination (51.6 and 57 degrees) launches. Moron AB is a Spanish military airfield used jointly by the Spanish Air Force and USAF. It is located approximately 35 miles southeast of Sevilla and 75 miles northeast of Naval Station Rota. The runway (heading 03/21) is 11,800 ft by 200 ft, with 1,000 ft overruns and 50 ft asphalt stabilized shoulder.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 8

TAL SITES AND TAL COMMUNICATIONS

THIS PAGE INTENTIONALLY LEFT BLANK

c. Due to the nature of hazards present, no one should approach the Orbiter within 1,250 feet (400m) unless directed by a flight crew member. The vehicle is considered hazardous until declared safe by appropriate safety personnel.

d. Contact NASA, JSC, MCC, CAPCOM through Houston Voice. (Phone numbers are available in the actual FDF.)

e. Provide U.S. citizen(s), if available, with a secret clearance, for 24-hour security of the Orbiter and flight crew.

f. Provide interpreters, if available/needed.

g. Provide escorts, transportation, lodging, and meals, as necessary, for the flight crew until they are evacuated.

h. The RRT will arrive in approximately 25 hours, depending on the landing location. Personnel will include NASA management, Orbiter Tow Team, MIT, DOD, and flight crew representatives.

i. The flight crew will not meet with media representatives. The flight crew statement will be released from JSC.

j. Contract a photographer to be escorted to safe areas to take photos of the Orbiter, any debris, and anything else that appears out of the ordinary (e.g., fire, smoke, fumes). The film will be purchased and should not be developed unless directed by the MIT.

k. If any damage occurs to the Orbiter, debris should be left in its place with documentary photographs and location descriptions taken. Debris should not be handled to preclude injury or disturbance of the scene. Avoid debris having a fishy-ammonia, pungent-sweetish, or ammonia-like smell. Seek immediate medical attention for irritation to the nose, throat, or eyes; or coughing and difficult breathing. Area should be secured at a 1,250-foot radius to preclude sightseers from disturbing the scene or picking up anything.

l. Record, with time indices, any pertinent observations.

m. Arrange to have witnesses contacted. Obtain their names, addresses, and telephone numbers.

n. The Orbiter is not normally towed until the KSC RRT arrives. Strongly discourage any towing of the Orbiter. It cannot be safely towed/moved without special equipment. Contact NASA KSC for further information if the airfield officials insist.

o. The flight crew commander is responsible for the Orbiter and flight crew. It will be necessary for him to stay in contact with the NASA MCC in Houston, Texas. Assist him in any way possible.

5. JSC FCOD representative

6. Mishap Investigation Team

7. Payload representative

8. DDMS representative

k. The JSC KC-135 will be deployed to pick up the flight crew at their evacuation location. ETA is landing plus 16 hours.

l. Flight crew member's passports will be carried by the FCOD representative on-board the JSC KC-135 which will arrive approximately 16 hours after the landing. Personnel on the KC-135 will include, but are not limited to:

1. JSC FCOD Director and/or his representative(s)

2. JSC Flight Surgeon

3. JSC PAO representative

4. KSC Security representative

m. The flight crew will brief the RRT and MIT personnel via telecon, as required, from both the landing site and evacuation site, as needed.

n. The MCC may advise the commander that the flight crew can approach the Orbiter. This may include authorization to close the side hatch. The flight crew may then enter the Orbiter and retrieve clean clothes or any other needed articles. The flight crew should also retrieve the "Return to Houston" items at this time.

o. The flight crew shall brief a FCOD or RRT representative on locations of early return items to be removed from the Orbiter for return to JSC if they are unable to retrieve them prior to evacuation.

p. Security requires that a U.S. citizen with a secret clearance remain with the Orbiter at all times, and that the side hatch be closed as soon as possible.

1.4 GUIDELINES FOR U.S. EMBASSY AND LOCAL AIRFIELD OFFICIALS

a. When medical attention is required for the flight crew, a U.S. citizen should stay in contact with the injured crew member(s), if possible. Arrangements will be made with DOD to evacuate both injured and uninjured personnel to the nearest U.S. military base.

b. The flight crew will be retrieved by the NASA JSC KC-135 aircraft from their evacuation location.

b. A DOD MEDEVAC aircraft with a medical team will be dispatched to the landing site as soon as possible.

c. The commander will retain responsibility for the flight crew and Orbiter until either (1) the DOD MEDEVAC aircraft arrives to evacuate the flight crew, or (2) the RRT arrives.

d. The commander or his representative will meet with the local airfield officials and give them the prepared guidelines for local airfield officials. He will briefly advise them on vehicle hazards and safety requirements and inform them that towing should not be attempted. A representative from the U.S. Embassy in the host country will arrive at the airfield as soon as possible to assist with coordination of local officials.

e. The commander will arrange with the local officials to have 24-hour security provided for the flight crew and Orbiter. If a U.S. facility is nearby, these security forces should include at least one U.S. citizen each. The controlled access area should be a 1,250-foot radius around the Orbiter. The commander will designate a crew member to remain with the Orbiter until a U.S. citizen with a secret clearance arrives.

f. The commander should designate a crew member to maintain a log. He should note the local landing time and log any pertinent observations of the Orbiter and the sequence of events leading up to the landing.

g. The flight crew will establish communications with the MCC CAPCOM through Houston Voice as soon as possible. (Phone numbers are available in the actual FDF.)

h. All requests for the flight crew to meet with the media will be coordinated through the Manager, Launch Integration, KSC.

i. If there is a local U.S. facility, the flight crew may be escorted there to await transportation to the nearest U.S. military base.

j. The RRT will arrive in approximately 25 hours, depending on the landing location. The personnel will include, but are not limited to:

   1. KSC Ground Operations Manager

   2. KSC Convoy Commander

   3. KSC Tow Team

   4. KSC Logistics Team

j. The NASA personnel should aid the flight crew in retrieving early return items to be transported with the flight crew.

k. The flight crew will brief the RRT and MIT personnel via telecon, as required, from either the landing site or evacuation site.

l. If full crew departs, security requires that a U.S. citizen with a secret clearance (normally the GOM) assumes responsibility for the Orbiter. The side hatch will be closed as soon as possible.

m. For further information, see the non-augmented, non-U.S. military bases guidelines.

1.2 BASES WITH U.S. MILITARY PRESENCE AND NO NASA PERSONNEL

These guidelines only represent the deltas to the instructions for non-U.S. military presence, non-ALS's. Please refer to them for full instructions.

a. Evacuate the Orbiter and turn it over to the U.S. senior military official who will be responsible for the Orbiter until the arrival of the RRT. The Orbiter commander will designate a crew member to assist the DOD senior official in the safing and safeguarding of the Orbiter until crew departure.

b. The flight crew will be escorted to the Command Post to contact the MCC. There will be a teleconference one hour and 30 minutes after landing.

c. The flight crew will be escorted to appropriate facilities to await the arrival of the CRT. Meals should be available.

d. The U.S. military will assume responsibility for treatment of injured flight crew members.

e. All requests for the flight crew to meet with the media will be coordinated through the Manager, Launch Integration, KSC.

f. DOD has made previous arrangements to contact, train, and provide Orbiter documentation to the emergency and rescue forces. They therefore have a preliminary knowledge of Orbiter hazards and precautions.

g. The JSC KC-135 aircraft will be dispatched to pick up the flight crew. Estimated arrival time is 16 hours.

1.3 EMERGENCY LANDING SITE

a. Evacuate to a distance of 1,250 feet (400m). Beware of toxic fumes and burning tires. Notify the tower that only fire-fighting personnel should approach the Orbiter.

APPENDIX R, ATTACHMENT 7

INITIAL FLIGHT CREW RESPONSE

1.1 OVERSEAS AUGMENTED LANDING SITES

Augmented refers to the fact that landing aids and NASA personnel are in place. This includes the prime and back-up TAL sites.

a. Evacuate to a distance of 1,250 feet.

b. The commander will turn over responsibility of the Orbiter to the senior NASA representative on hand.

c. The flight crew will brief the local NASA representatives on the Orbiter status.

d. One hour and 30 minutes after landing, a teleconferenced debriefing will be held to report the condition of the Orbiter. The flight crew may speak with their families.

e. All requests for the flight crew to meet with media will be coordinated through the Manager, Launch Integration, KSC.

f. The DOD will be responsible for the initial treatment and transportation of injured flight crew members. It is planned that uninjured flight crew members will be transported by the MEDEVAC or SAR aircraft to Rota, Spain to wait arrival of the JSC KC-135 that will return to JSC. The local FCOD representative may go with the flight crew.

g. Flight crew members' passports will be carried by the FCOD representative onboard the JSC KC-135 which will arrive approximately 16 hours after landing.

h. Personnel on the KC-135 will include, but are not limited to:

   1. JSC FCOD Director and/or his representative(s)

   2. JSC Flight Surgeon

   3. JSC PAO representative

   4. KSC Security representative

i. The KSC Safety representative may advise the commander that the flight crew can approach the Orbiter. The flight crew may then enter the Orbiter and retrieve clean clothes and any other needed articles. The flight crew should also retrieve the "Return to Houston" items at this time.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 7

INITIAL FLIGHT CREW RESPONSE

TABLE R6.6

ESTIMATED BAILOUT RESPONSE TIMELINE

Time	Activity	References
Bailout (B) declared	Notification of NASA managers	
	LSO begins notification list	
B + 5M	MCC loses data, tracking	
B + 30M	NASA makes first press release	
B + 1H30M	NASA MRT	Attachment 3
B + 2H30M	Teleconference completed	
B + 3H	Press conference SAR reaches flight crew (assuming bailout is within 200 nm of launch and weather permitting)	
B + 6H	SAR recovers flight crew	
B + 12H	Estimated time for SAR to return flight crew to nearest medical facility	
B + 24H	Ships deployed to retrieve debris	

TABLE R6.5

ESTIMATED EMERGENCY LANDING RESPONSE TIMELINE (NON-CONUS) - Concluded

Time	Activity	References
L + 6H	Nominal medical examination C-17/C-141 arrives EAFB	Assumes KSC team already deployed to EAFB
L + 7H	KC-135 departs KSC	
L + 8H15M	C-17/C-141 departs EAFB	
L + 8H30M	Flight crew arrives nearest U.S. military base	
L + 13H30M	C-17/C-141 arrives SLF	
L + 14H	RRT and MIT briefed on situation	
L + 15H45M	C-17/C-141 departs SLF	
L + 16H	KC-135 arrives at flight crew location	
L + 22H	KC-135 departs for KSC	
L + 25H	C-17/C-141 arrives landing site	
L + 31H	KC-135 arrives KSC	
L + 32H	KC-135 departs KSC	
L + 34H	KC-135 arrives EFD	

TABLE R6.5

ESTIMATED EMERGENCY LANDING RESPONSE TIMELINE (NON-CONUS) - Continued

Time	Activity	References
L - 1H30M (approx)	Emergency declared Notification of NASA managers LSO begins notification list	Flight Director
L + 0	Landing Flight crew gives report to MCC	
L + 15M	MCC loses data Flight crew egresses Flight crew gives local officials emergency guidelines for ground personnel	Attachment 8
L + 45M	Flight crew telephones MCC	
L + 1H30M	NASA MRT	Attachment 3
L + 2H30M	Teleconference complete	
L + 3H	KC-135 departs EFD C-17/C-141 manifest and load changed as appropriate	KSC Shuttle Process Integration
L + 3H30M	Press conference for NASA officials	
L + 5H	DOD MEDEVAC aircraft arrives at the landing site (best effort) KC-135 arrives KSC TAL C-130 arrives landing site	
L + 6H	Flight crew departs on DOD MEDEVAC aircraft at SOC direction after notification by MCC KC-135 flight plan coordinated	

TABLE R6.4

ESTIMATED AOA RESPONSE TIMELINE

Time	Activity	References
L + 8M (to L + 30M)	AOA declared AOA site notified Notification of NASA managers LSO begins notification list	Flight Director Landing Recovery Director
L + 1H30M	Landing	KSC-KVT-PL-0014, Off-site Operations Plan, Appendix A
L + 2H	MCC loses data Flight crew egresses Orbiter Vehicle handover to KSC Brief medical examination	OMI S0026, Post-landing Convoy Operations - DFRF
L + 3H	NASA MRT	Attachment 3
L + 4H	MRT complete	
L + 4H30M	Flight crew departs for JSC on STA weather aircraft Press conference for NASA officials	
L + 5H	MIT deployed	Attachment 4
L + 8H30M	Flight crew arrives JSC	
L + 48H	Full KSC turnaround team begins operations	

TABLE R6.3

ESTIMATED TAL RESPONSE TIMELINE - Concluded

Time	Activity	References
L + 18H	C-17/C-141 arrives TAL site	
L + 23H	KC-135 departs evacuation site	Based on crew sleep cycle
L + 31H	KC-135 arrives KSC	
L + 32H	KC-135 departs KSC	
L + 34H	KC-135 arrives EFD	
L + 36H	DOD Tanker Airlift Command Element arrives TAL site (two airplanes)	
L + 48H	First C5 arrives TAL site with GSE load	

TABLE R6.3

ESTIMATED TAL RESPONSE TIMELINE - Continued

Time	Activity	References
L + 4M	TAL declared Notification of NASA managers LSO begins notification list	Flight Director
L + 40M	Landing	
L + 55M	MCC loses data Flight crew exits Orbiter Vehicle handover to ground personnel	
L + 2H	NASA MRT	Attachment 3
L + 3H	MRT complete KC-135 departs EFD C-17/C-141 manifest and load changed as appropriate C-130 departs other augmented sites with personnel and equipment	
L + 3H30M	Press conference for NASA officials	
L + 4H	Flight crew departs TAL site on DOD C-130 (medevac)	
L + 5H	Flight crew arrives evacuation site KC-135 arrives KSC Nominal medical examination C-130 arrives at the landing site from other augmented sites	
L + 6H	C-17/C-141 arrives SLF KC-135 flight plan coordinated RRT and MIT briefed on situation	
L + 7H	KC-135 departs KSC	
L + 8H15M	C-17/C-141 departs SLF	
L + 16H	KC-135 arrives evacuation site	

TABLE R6.2

ESTIMATED CONTINGENCY ABORT LANDING TIMELINE

Time	Activity	References
L+4M	Contingency Abort declared Notification of NASA managers LSO begins notification list	Flight Director
L+40M	Landing	
L+55M	MCC loses data Crew powers down vehicle Flight crew exits orbiter C-130 MEDEVAC Local officials protect 1250 feet perimeter around the vehicle	
L+2H	MRT	Appendix 3
L+3H	MRT complete KC-135 departs EFD C-17/C-141 manifest and load changed as appropriate	
L+3H30M	Press conference for NASA officials KC-135 arrives at landing site	
L+6H	C-17/C-141 arrives SLF RRT and MIT briefed on the situation	
L+8H15M	C-17/C-141 departs SLF	

APPENDIX R, ATTACHMENT 6

ESTIMATED CONTINGENCY LANDING RESPONSE TIMELINES

TABLE R6.1

ESTIMATED RTLS RESPONSE TIMELINE

Time	Activity	References
L + 3M	RTLS declared Notification of NASA managers LSO begins notification list	Flight Director
L + 25M	Landing	
L + 45M	Flight crew egresses Orbiter MCC loses data Vehicle handover to KSC Turnaround operations begin	OMI S0028, Post-landing Convoy Operations - WSSH
L + 1H15M	Flight crew arrives Crew Quarters Brief medical exam	
L + 2H	NASA MRT	Attachment 3
L + 3H	Teleconference complete	
L + 3H30M	Press conference for NASA officials	
L + 4H	Flight crew returns to JSC aboard STA	

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX R, ATTACHMENT 6

ESTIMATED CONTINGENCY LANDING RESPONSE TIMELINES

THIS PAGE INTENTIONALLY LEFT BLANK

FIGURE R-1

SPACE SHUTTLE MISHAP INVESTIGATION TEAM